NOV 29 1920
CHEMICAL LIBRARY

GAS JOURNAL

LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

VOL. CLII. No. 3000.] LONDON, NOVEMBER 10, 1920. [72ND YEAR. PRICE 8d.

OXIDE OF IRON
SPENT OXIDE

GAS PURIFICATION AND CHEMICAL CO., Ltd.
PALMERSTON HOUSE, LONDON, E.C. 2.
Telegrams: "PURIFICATION, LONDON."
Telephone: 9144 LONDON WALL.

TORBAY
STOVE BLACK
FOR GAS COOKERS.

The TORBAY PAINT CO.,
26/28, Billiter St., LONDON, E.C. 3.
39/41, Old Hall St., LIVERPOOL.

CHEMICAL LIBRARY
ALUMINIUM CANNOT RUST.
NOV 26 1920
UNIV. OF MICH.
WRITE FOR.. GAS LEAFLET
THE BRITISH ALUMINIUM CO., LTD.,
109, Queen Victoria Street, London.

GAS & CANNEL COAL CONTRACTORS.
WM. F. RUSSELL & SONS.
Telegrams for all Offices: 'MONKLAND."
GLASGOW: 90, Mitchell Street;
NEWCASTLE: Exchange Buildings;
HULL: Exchange Buildings, Lowgate;
LIVERPOOL: 5, Castle St.; &
SWANSEA: Atlantic Buildings.

W. PARKINSON & CO.
(Incorporated in Parkinson and W. & B. Cowan, Ltd.),
LONDON & BIRMINGHAM.
(See Advertisement p. 322).

R. & W. HAWTHORN LESLIE & CO., LTD.
In Stock.
TANK LOCOMOTIVES
Always in Progress.
Locomotive & Marine Engineers & Shipbuilders,
NEWCASTLE-ON-TYNE.

INTERMITTENT
VERTICALS.
Adopted all over the World.
Vertical Gas Retort Syndicate LTD.,
17, VICTORIA ST., WESTMINSTER, S.W.
Sole Agents for Australasia—
JAMES HURLL & CO. LTD., SYDNEY.

JAMES McKELVIE & CO.
Coal Owners,
Gas and Steam Coal Contractors,
17, RUTLAND SQUARE, EDINBURGH.
59, MARK LANE, LONDON, E.C.
GUILDHALL CHAMBERS, SANDHILL, NEWCASTLE-ON-TYNE.
24, CHAPEL STREET, LIVERPOOL.
ESTABLISHED 1840.

STEWARTS AND LLOYDS, LIMITED, 41, OSWALD STREET, GLASGOW. BROAD STREET CHAMBERS, BIRMINGHAM.
TUBES & FITTINGS for Gas, Steam, Water, &c.

ESTABLISHED — 1861 —
Telegrams: "DRY METERS, LONDON."
Telephone: KENSINGTON, 1140.

George Glover and Co., Ltd.
RANELAGH WORKS
Royal Avenue, Chelsea
LONDON, S.W., 3.

Highest Awards at the Principal International Exhibitions.
Branches at LEEDS (9, Dewsbury Road) and MANCHESTER (Gaythorn Meter Works, Easton St.).

SPECIALISTS IN DRY GAS METERS—SLOT, KEY, AND ORDINARY.
Every meter leaving GEORGE GLOVER AND CO.'s works, irrespective of size—and they build up to 3000 Lights—is regulated and tested for soundness at 12 in. pressure, and for registration not only at the ½ in. pressure prescribed by the "Sales of Gas Act," but at 3 in. pressure with full outlet capacity, so as to prevent "slow" registration even when the meter is overworked.
AGENTS FOR THE PATENT M. & M. SELF-LOCKING SLOT METER PADLOCK.

J. & J. BRADDOCK

(Branch of Meters Limited),

GLOBE METER WORKS,

Telegrams: "Braddock, Oldham." Telephone 815.

OLDHAM,

AND

45 & 47, WESTMINSTER BRIDGE ROAD,

Telegrams: "Metrique, Lamb London." Telephone 2419 Hop.

LONDON, S.E. 1.

MANUFACTURERS OF HIGH-CLASS

GAS STATION METERS.

BRADDOCK'S

STATION GOVERNORS

AND

RETORT-HOUSE GOVERNORS.

IMPROVED

WET & DRY GAS METERS

OF BEST QUALITY.

BRADDOCK'S PATENT

"SLOT" METERS.

FULL PARTICULARS ON APPLICATION.

TELEGRAMS: "SEAWARD, HULL."

TELEPHONE: 5571 CENTRAL.

ARTHUR WHARTON & CO.

EXPORTERS OF

GAS, FURNACE & FOUNDRY

COKE, COAL TAR & PITCH.

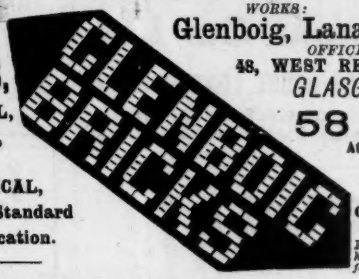
HULL.

THE GLENBOIG UNION FIRE-CLAY Co. Ltd.

WORKS: Glenboig, Lanarkshire.

OFFICES: 48, WEST REGENT ST., GLASGOW.

GAS-RETORTS, HORIZONTAL, INCLINED, and VERTICAL, to New Standard Specification.



58 FIRST AWARDS At International and Home Exhibitions, including Grand Prize at Brussels, 1910.

In every case the highest award given for Fire Clay Goods.

The Glenboig Bricks, Blocks, and Retorts combine, in the highest degree, the qualities of not melting, and not splitting, when subjected to the highest heats and sudden changes of temperature, and are, in consequence, found to be economical, even in districts where the local bricks can be had at half the price.

B DONKIN D

DONKIN

for

DISTRICT SERVICE GOVERNORS

HIGH AND LOW PRESSURE SERVICE REGULATORS, METER REGULATORS,
STOVE AND LAMP REGULATORS, SERVICE CLAMPS AND FITTINGS.

THE BRYAN DONKIN COMPANY, LTD.,

Head Offices & Works, **CHESTERFIELD.**

LONDON OFFICE: 3, VICTORIA STREET, WESTMINSTER, S.W. 1.

Chesterfield Telephone No. 84.
London Telephone No. 5338 Victoria.

Chesterfield Telegrams, "Donkin, Chesterfield."
London Telegrams, "Donkin, Vic. London."

B CHESTERFIELD D

GAS JOURNAL

LIGHT ✦ HEAT ✦ POWER ✦ BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

EDITOR & PUBLISHER: WALTER KING. OFFICE: 11, BOLT COURT, FLEET ST., LONDON, E.C. 4.

VOL. CLII., No. 3000.] WEDNESDAY, NOVEMBER 10, 1920. [72ND YEAR.

EDITORIAL NOTES.

Life again in the Coal-Fields.

THE coal miners have had their strike, and are much worse off in pocket for the experience. They have collectively lost a large sum of money in wages—probably not far short of £16,000,000; and their District Unions are reported to be something like £2,000,000 out of pocket in respect of strike pay. We should not be surprised if this is not an underestimate when all expenditure connected with the strike is brought into account. The country, too, has lost something like 13 million tons of coal output. Consequential results are that a great amount of unemployment has been inflicted upon other industries, or has produced short-time working, and manufacture and exports have suffered considerable diminution. And all this due to the escapade of the extremists of the Miners' Federation. The Government stood firm on questions of principle, but left the door wide open for negotiation on any lines that appeared to possess the quality of feasibility. The agreement that was ultimately reached (the main features of which were given in last week's "JOURNAL") could thus have been fully realized without the fearful waste there has been. The result of the ballot of the miners was that the agreement was accepted by 338,045, and 346,524 were against acceptance. So the voting was pretty equal, with an insignificant majority against acceptance. A notable point is that only about 75 p.ct. of the members of the Unions constituting the Federation took any part in the ballot. A strike of the miners can only be declared if a two-thirds majority of the men voting are favourable; and so the same rule applies to the calling-off of a strike. Thus the Miners' Federation had no difficulty in issuing the necessary instructions to resume work; and we think that, all things considered, they were rather glad than otherwise to be able to do so, as much for domestic as for patriotic reasons.

However, coal (we hope in liberal quantities) is again coming to the surface, and that is something for which to be thankful. Some pits re-started working on Thursday—the day following the decision of the Federation as the result of the ballot; and by Monday it was reported that the bulk of the pits again wore their normal appearance. The result is not altogether to the liking of the extremists; and there were threats of sectional refusals to recommence work. But no good could have come to a small minority standing-out when a large majority were glad enough to be earning again. The minority in such circumstances by standing-out would have only been punishing themselves. Of course, the first deliveries of coal will be devoted to restoring employment where unemployment exists through the strike. The immediate cancelling, too, of the various Emergency Orders referring to fuel, power, and light has also brought relief. Gradually, deliveries will recommence to gas-works, which have had to work from stock for three weeks, and will have to do so largely this week. This has made an appreciable difference to gas-manufacturing costs. Everybody will now be hoping that the miners will have the good sense to put their backs into production, and try at any rate to make good some of the injury they have done the country. Also that the result of the agreement will be a steadier condition of things in the mining industry, and that eventually a stable plan of wage and profit earning will be produced. But in whatever is done, it is to be hoped that the heavily weighted consumer of coal will not be overlooked. He would like to know that henceforth he is going to be remembered.

One matter for serious reflection and regret is that Mr. William Brace, M.P., and Mr. Vernon Hartshorn, M.P., have severed their connection with the Executive of the Miners' Federation. They were influences in that body, and did a good part in retarding the activities of the extremists, who, however, were too powerful in numbers for them. The extremists no doubt will be glad to be quit of their two unwelcome colleagues. But the miners have good ground for regret, if they realize fully what this means. They have lost two of their best friends, who tried to hold the balance fairly between their interests and those of the public. Men of the stamp of Messrs. Brace and Hartshorn see farther than the extremists, who are only out for social disruption.

The Therm and the Customer.

THERE is a proneness to overlook the fact that what the gas specialist knows is not necessarily the knowledge of the general public. A very important reason exists to-day why this fact should not be overlooked, and for the gas industry to arouse itself, and institute a special therm educational campaign throughout the country. We are standing before a beneficial change in the industry, which will place the sale of its prime commodity upon the basis of quality and not volume, as hitherto. The public know very little about this. They are not aware of the reasons there are for it. They do not know what are the economic grounds for the change. Many of them do not understand even the elementary point as to what constitutes a B.Th.U.; and a therm is as Greek to the great majority. With the varied degree of intelligence among the public, the industry in this matter has to begin at the very beginning, and be strictly rudimentary in its teachings. It is all uncultivated, but arable land, upon which the industry has to work; and the work must be well done. It will pay. It will produce confidence in the change; and confidence is necessary.

The facts have to be faced that profound ignorance exists regarding this matter, and that the ignorance can only be removed by steady, unremitting work. A fair sample of that "profound ignorance" was offered to readers of the "Daily Telegraph" the other day in a letter signed "A "Poor Consumer." Evidently this sample of the general public did not know that the proposal for the transfer from the sale of gas by volume to the heat-unit basis emanated from the Fuel Research Board of the Committee of the Privy Council for Scientific and Industrial Research, and not from the gas industry, and that, whether the gas industry likes it or not (it does like it, because it knows it is a good change, which will inure to public confidence in the fair dealing of the industry), the change has to come about because Parliament has so ordained. This is one fact that should be placed before the public. Then Parliament would not have enacted that there should be this change had it not been convinced that it was in the interests of the public to pay only for value received and not volume, which might not always be up to standard quality. The passing from sale by volume to sale on the heat-unit basis is a great protection for the public—a greater protection than the public has ever had in connection with gas supply. The public does not know how this can be. They must be satisfied. They know nothing about those silent guardians of their interests that are to be set up all over the country—the recording calorimeters—which will be under the control of expert examiners (appointed by local authorities), who will have a prescribing and supervisory body above them known as the Gas Referees, who, in turn, will be responsible to the Board of Trade. The public are only aware that the gas-meter will still exist, and that the volume of the gas used will still be registered. They do not know that continuously guarding testing machinery is to be established which will

assure the quality in B.Th.U. per cubic foot for which they will be charged, and that the cubic feet used will be multiplied by the quality to ascertain the number of therms (or 100,000 B.Th.U.) supplied. The public must be told these things; otherwise they will know nothing at all about them. At present a consumer in one district may ask a consumer in another district, "What are you paying for gas?" The reply is (say) 4s. 7d. per 1000 c.ft.; the other man probably says: "We pay only 4s. 1d." Neither of them knows anything as to the quality of the gas. The 4s. 7d. charge may be for gas of a value of 500 B.Th.U. per cubic foot, or 500,000 B.Th.U. per 1000 c.ft.; the other man may be getting only 450 B.Th.U. gas, or 450,000 B.Th.U. per 1000 c.ft., and will have to buy 111 c.ft. more gas for 6d. to obtain the equivalent potential heat value received by his friend in the neighbouring area. When all consumers pay 1d per therm, or 100,000 B.Th.U., they will be buying something which has potential equality, no matter the district in which they are residing; and price comparisons will therefore be upon a level basis. These are facts that also require to be brought home to consumers throughout the country.

The letter of "A Poor Consumer" shows that to be so. "I cannot help thinking," he writes, "that the public have "not yet grasped the significant point that the number of "thermal units per cubic foot varies, and has to be 'stated' "by the gas company in question, and this company may or "may not work up to it." This view is no doubt a very general one; and it has to be set right. The consumer has to be shown that the "declared" calorific value is the one which the testing machinery—the recording calorimeters, the Gas Referees, and the local authorities' official examiners—has to see is supplied; and if not, the Gas Regulation Act provides for penalties against the suppliers, and for the consumers not losing a penny resulting from any deficiency. Make that fact also sink well into the public mind; for the public have never in the whole history of the gas industry been defended in anything like the same rigorous manner. The gas industry does not object; for its responsible men know full well that its interests are best served by the consumers being satisfied that they are getting what they pay for. "It looks to me," writes the same correspondent, "as if the poor consumer will find "when he has worked out his gas bill in terms of therms, "that he is paying more money for a gas of much lower "quality." This shows the pitiable state of ignorance that prevails. The consumers are only going to pay for heat units in the future which the gas is capable of supplying on combustion. If (say) five therms require 1000 c.ft. or 1250 c.ft. to be supplied, they will get five therms, and only pay for five. This must be made clear to the public. Moreover, there is advantage to the consumer in the new rule that each undertaking is to be allowed to declare the calorific value per cubic foot which best suits its plant, coal, and other conditions; and this confers upon the undertaking the ability to work within its own limits in the most economic and efficient manner. Through this—subject, of course, to costs of materials, plant, and labour—there should come benefit to the consumer.

The pardonable ignorance on the part of the public as to these matters must not be matched by an unpardonable indifference on the part of the industry to the removal of the ignorance, and to the full and correct informing of the public. We have made points in this article which every gas man knows; but every gas man does not appear to realize the fact that the public are not so well-informed upon them as he is himself. The new legislation and the change to which it commits the industry in its trading operations are fundamental to its future. What is going to take place is in the nature of a new bargain with the public; and the Board of Trade have been entrusted by Parliament with the task of adjudication and determination. The industry has to ensure that the public as parties to the new method of transaction understand the details, and that they stand to gain and not to lose by it. Many opportunities have come in the way of the British Commercial Gas Association for doing good work; this is not the least of them.

Lower Calorific Power Gas.

THE movement towards the supply of gas of lower calorific power per cubic foot is making headway. Experience offers no obstacles when conditions as to pressure, constant composition, and regulation of the consuming appliances are right, and general circumstances invite the highest value in B.Th.U. being obtained per ton of coal, subject to exceptional markets and values for secondary products. The Gas Regulation Act paves the way; the new costs of coal and other materials, labour, capital, and plant, urge the highest profitable make of therms per unit of any one of them. That is the line of economy; and therefore the road to the lowest price per therm. Many old notions have had their disqualification to continued acceptance proved by experience; and new experience is offered by Mr. James Jamieson, of Greenock, in the Presidential Address which he recently delivered before the Western District of the Scottish Junior Gas Association. Greenock has favourable opportunities for determining whether for a variety of purposes—domestic and industrial—there is any disadvantage in the supply of lower calorific power gas; and there is something positive in the form and definite in the substance of this one declaration of Mr. Jamieson: "From actual ex- "perience, I am strongly of opinion that the use of low-grade "gas is highly beneficial; and whether 450 or 400 B.Th.U. "gas is supplied, makes but little difference, provided its "composition is constant, and the pressure arrangements "adequate." Greenock supplies a lesson for go-aheadedness to many other undertakings. Already all the gas-consuming appliances in the district have been adjusted for lower calorific power gas; and the Gas Department are ready at any time to supply gas of 400 B.Th.U. or below, as circumstances may dictate. There are few undertakings that can say so much as this, and supplement it with the assertion that gas of that calorific power has been distributed "with excellent results, and with no increase in the normal "complaint list." Mr. Jamieson lays great stress on pressure, describes what is being done to maintain it, and the methods of control in each district into which the supply area has been divided. "We have tackled the pressure "arrangements of our town as if our very existence de- "pended on them, realizing that on this point depends "the success of the introduction of low-grade gas."

The address contains a large amount of information which points to the Gas Department operating on enthusiastic and correct lines to capture the furnace-heating work in the engineering and shipbuilding yards. Great success meets the efforts, as it must do all well-directed endeavour which aims at securing absolute suitability to purpose. There has been too much haphazard installation in certain quarters, before making a complete study of requirements. In this connection, the President gives prominence to the importance of delivering gas at the point of combustion at a sufficiently low price to undercut all other fuels. Incidentally, he mentions that for one furnace operation gas is sold at 2s. 4d. per 1000 c.ft.; and, we take it, this is gas of approximately 450 B.Th.U. If the assumption is correct, then the gas is being sold at 6·2d. per therm, which is a good competitive figure when all the relative charges and efficiencies of fuels are taken into account. A drawback to a lower price is the high ash content of coal to-day. The coal supplied to Greenock has during the past three months been containing some 20 p.ct. of ash, as compared with 8 p.ct. before the war. The consumption of coal is at present 36,000 tons a year; and it is calculated that the increased ash content is responsible for an annual loss of £9863, or 4·06d. per 1000 c.ft. of gas. This is a serious business for gas undertakings and for gas consumers. The difference in ash content is 12 p.ct.; but this does not mean only 12 p.ct. cash loss for paying for increased ash the same price as for coal. It imposes a loss of efficiency upon plant, labour, and everything else in the region of production; and this is actual money waste.

Consideration is given by Mr. Jamieson to the questions of the production of lower calorific power gas by steaming in vertical retorts and to the making of water gas in separate plant. This part of the address is also worth reading. It deals in the first place with the working conditions when steaming in vertical retorts, so as to ensure the minimum of trouble, gas low in CO_2, and coke of uniform quality. Suitability of coal, and the desirability of having means to secure absolute control of the volume and the temperature of the steam hour by hour, are among the contributories to good results. It is intended, with the improved "K & A" plant which is installed at Greenock, to admit water gas to the Woodall-Duckham vertical retorts, either alone or with a little steam, so as to derive the maximum benefit in therms. The points are too many for separate treatment in this article. But, in conclusion, just one small correction. Mr. Jamieson says the makers of vertical plant should

ensure that mouthpieces and off-take fittings are absolutely air-tight "now that inerts are limited." There is no statutory limitation upon inerts except in the case of the South Metropolitan Gas Company; and the limitation there was voluntarily imposed. Nevertheless, one of the reports of the Gas Investigation Committee presented at the last meeting of the Institution of Gas Engineers is an index to the inerts point that it is well should not be exceeded, having in view the variety of the applications of gas—some being high-temperature and some low-temperature operations. As gas undertakings have no disposition to commit suicide, their managements will see, without any statutory limitation, that they do not go beyond the bounds of prudence. "The "bounds of prudence" are a long way removed from the only example of limitation in an Act of Parliament, which follows the modified proposals made by the Board of Fuel Research.

Sulphur Removal by Oil.

IN this country we have not come to the stage when serious consideration has been given to the question of adopting oil-washing for the specific purpose of reducing the sulphur compounds in gas. But probably it will receive attention in conjunction with some other process—that is to say, making the oil-washing responsible for more than one duty. For example, it has been found that washing for the extraction of benzole from gas causes very material reduction of the sulphur compounds. Consequently, there may be developments in this direction. But on the evidence before us we are not persuaded that—in view of the costs of oil and of the double process of oil-washing and distillation for freeing the spent oil from the sulphur, so as to enable it to be used again—it is a process that for the purpose of sulphur removal only could be economically adopted in this country.

However, that is only a matter of opinion on first-blush and insufficient trial experience, to which experience Mr. E. R. Hamilton contributed in the paper that he read before the Canadian Gas Association, and which is published in this week's issue. Mr. Hamilton has to deal with conditions to which we are unaccustomed in this country. There is something to be thankful for that British coals are not as Nova Scotian coals. Just imagine having to deal with coal containing 2·25 to 2·75 p.ct. of sulphur, or 50 lbs. and upwards per ton of coal, and gas containing as much as 120 grains per 100 c.ft. of sulphur compounds other than sulphuretted hydrogen, or on an average between 60 and 70 grains! These are the conditions Mr. Hamilton has to negotiate. We do not envy him; and they point to exceptional conditions requiring exceptional treatment. His paper shows that consideration of the method of treatment has roved over the entire gamut of purification processes, and in the end came settlement on washing with paraffin oil as being the most suitable system in the circumstances. The laboratory experiments gave surprising results—from 70 to 80 p.ct. reduction in the sulphur compounds being obtained; and in an experiment by the circulation of oil in ammonia tower scrubbers a reduction of 50 p.ct. was found. So great has been the satisfaction, that a series of three steel towers (containing wooden grids) is to be set-up for the purpose, with pumps and oil-storage and oil-collecting tanks, and plant for the distillation of the spent oil at low temperature for the removal from it of the carbon bisulphide. When this is accomplished, the oil will be pumped to the fresh-oil tank for recirculation.

There is nothing in the paper about costs and estimated or actual oil losses. This would have been an interesting feature. Apart from capital and maintenance charges, the costs will be somewhat heavy; but it must be remembered that Mr. Hamilton has to do something to retain his gas business, as people are not at all partial to the use of gas containing such a large amount of sulphur. The oil will cost money. There is no exact knowledge how much oil will be wanted. Mr. Hamilton speaks of the laboratory experiments suggesting from 0·5 to 1 gallon being required per 1000 c.ft. to reduce the sulphur content of the gas by 50 p.ct. There is a big difference between 0·5 and 1 gallon when the total requirements in bulk are considered. The limits of the bulk will be measured by the time that is taken to distil the spent oil and return it to the clean-oil storage, *plus* the storage needed for replacing the oil losses. Another point about which there is no definite information is as to how long the oil can be used before its efficiency is impaired. The pumps will be operated by motor-driven gear. There will be cost here for power; and here, as power and pumps are to be utilized, the point may be raised as to why tower scrubbers are to be used instead of mechanically operated washers, unless some question of time-contact comes in. The low-temperature oil distillation will also cost money. It will be interesting if Mr. Hamilton will, as soon as he has had sufficient working experience, supply the omissions in the paper in respect of costs.

We have spoken of the possibility of the efficiency of the oil becoming impaired; and Mr. Hamilton anticipates this. As time goes on, the oil may, he says, become saturated with heavier oils from the gas; and the effectiveness of the oil will be reduced. Benzole and toluol, too, he says, will be absorbed; and the resultant reduction in heating value is another problem. This reduction is not a great one; but it is no use having a reduction of the constituents of the gas unless they are going to be utilized as a separate commercial product, though Mr. Hamilton refers to the returning of the benzole to the gas if extracted, or alternatively keeping the washing oil saturated with benzole. There is another point not mentioned in the paper, and it is that there will have to be regulation of the temperature of the oil to the gas; otherwise there may be inconvenient exchanges from the one to the other. However, we shall be looking to further information on these and some other points when Mr. Hamilton has amassed working experience.

Therm Price and Dividend Calculations.

In another column, Mr. H. R. Askew, Assoc.M.Inst.C.E. B.Sc., draws attention to a graphic method of making calculations of dividend and price changes on the therm basis. This will be found very interesting at the present time when gas directors and officials are exercising their minds as to the results on the capital of the price per therm they are contemplating asking for in their Orders. It also forms a useful supplement to the recent discussion that has been proceeding in our columns on price per therm movements.

Notices for Orders.

Some of the first notices of applications for Orders have been published; and reference is made to them in another part of this issue. The old maximum or standard prices are given, as well as the maximum or standard prices per therm which are now sought. The applications are under the consideration of the local authorities; and the suggestions made by or against the applicants will be the subject of adjudication by the Board of Trade. This is not the time to express any opinion, other than to say that, calculating out the old maximum and standard prices to a price per therm, 100 p.ct. increase, having regard to the new level of producing costs, is very moderate. Some of the prices per therm sought do not reach 100 p.ct. increase. In considering the price per therm, it does not follow that the standard prices in the case of sliding-scale companies will be charged; the stock and shareholders have also to be considered. We see the Sheffield Gas Company have adopted 0·2d. movements in price.

Industrial Gas Competition.

In industrial areas gas undertakings that are applying for Special Orders under the Gas Regulation Act, or going in for new Acts of Parliament, should include the power-gas clauses, to enable them to give a supply of power gas within a limited district where there is a collection of industrial establishments. Mr. James Jamieson, in his Presidential Address to the Western District of the Scottish Junior Gas Association, calls attention to the importance of securing these powers, in view of the activities of certain owners of low-temperature processes who are hoping to get plants installed for supplying groups of manufacturers with producer gas made from low-temperature coke. It will be remembered that the Board of Fuel Research, in their report on gas standards [see "JOURNAL," April 29, 1919], contemplated that in industrial areas there would be development by gas undertakings in this direction; and they anticipated that the adoption of the system of charging only for thermal units of energy actually delivered to consumers would greatly stimulate the industrial use of gas. In the Gas Regulation Act, clause 10, sub-section 2 (*b*), enables the Board of Trade to "empower any undertakers to give a separate supply of gas for industrial purposes within their authorized limits of supply." Clause 10 is the one dealing with Special Orders.

The Dye Industry.

Between dye producers and dye users the Government appear to be in some difficulty. The imports of dye-stuffs have been increasing substantially the last few months, and a large proportion of these are coming from Germany—some under the reparation clauses of the Treaty. From time to time, it has been stated on behalf of the Government that the import of dye-stuffs would be controlled by a system of licences, for a period of not less than ten years after the war. But licences have not come into operation yet. Dye users are agreed that tariffs or licensing will place difficulties in the way of their securing the dyes they require; and therefore tend to hamper their trade. Some members of Parliament consider that the situation might be met by a combination of tariff and bounty; others hold that a licensing system alone is the best means of dealing with the question. Meanwhile, the position is anything but pleasant for the British Dyes Corporation and other producers. The Government, however, are aware that the existence of a strong synthetic dye industry is essential to the United Kingdom; and proposals regarding it are to be embodied in the Bill dealing with key industries.

Interesting Coal Figures.

In the first week of the coal strike, coal production did not completely stop. All told, there was an output of 12,500 tons, made up by small contributions from the different fields. The total, however, is but a teaspoonful, compared with the ordinary production. In the week ending October 16, the output was 4,611,600 tons; and we have been looking at 4,800,000 tons as approximately a normal week's output during recent months. Information has been published as to output, wages, &c., during the first six months of 1913 compared with the first six months of this year. The disposable coal produced in the first half of 1913 was 132 million tons; in the first six months of this year, 108 million tons. The wages in the respective periods amounted to £45,500,000 and £129,800,000. The pithead values of the coal were £73,000,000 the first six months of 1913, and £192,700,000 in the corresponding half of this year.

Revelations after the Strike.

In the wake of the coal strike there come some revelations, which show the destructive policy that has got strong hold in the inner circles of some trade unions. Mr. Vernon Hartshorn, M.P., who has resigned his position as a member of the Executive of the Miners' Federation, has made a strong attack upon the condition of things that exists in the Executive. It seems the Federation is suffering from demoralization through men of "reckless minds and muddled views." "These men," he says, "are deliberately developing in the coalfields a policy which aims at cutting-down output, of organizing strike after strike in order to bring about the ruin of the industry, and of denouncing everybody who is not prepared to lend himself to the promotion of this insane policy." These men he describes as "strike mad." It is not a comfortable reflection that such men should hold major power in a Federation the members of which are such potent factors in the domestic and industrial life of the country. Then we have Mr. J. H. Thomas pointing out, at a meeting on Sunday, that only lately in the National Union of Railwaymen, there was a majority of the delegates who voted in favour of a railway strike in order to support the miners; but in his view this would have been ruinous to the case of the miners, and would have led to a social upheaval in the country. He, too, is of opinion that the real cause of all the trouble is that in the past the members of the Union, instead of taking an interest in their branch affairs, have allowed a small minority to do the work. The evidence in Mr. Thomas's possession proves that there was a tremendous flood of opinion among the railwaymen that, as the miners were balloted before they struck, the railwaymen should also be asked to ballot before they were called upon to strike to support the miners. Mr. Thomas warns the railwaymen against the folly of assuming that they could have a strike every day in the week. However, this all shows how near the country stood to the brink of a greater catastrophe than even the miners' strike, and this due to the power of the extremist element in the executives of the great trade unions.

PERSONAL.

It will be seen from a report of the proceedings of the Darlington Town Council appearing in our news columns to-day, that Mr. A. E. RUFFHEAD, now Assistant Gas Engineer, has been appointed to succeed Mr. F. P. TARRATT as Engineer and Manager. At the same time, Mr. Tarratt was voted an honorarium of £150, as a mark of appreciation of long and valuable services. Mr. Ruffhead has acted for the past eleven years as Mr. Tarratt's assistant. There were 34 applications for the post.

The retirement of Mr. S. S. FIELD from the position of Superintendent of the Ordnance Wharf Tar Works of the South Metropolitan Gas Company, was the occasion of a gratifying manifestation of the esteem in which he was held by those who served under him. There was a farewell meeting, at which Mr. and Mrs. Field and all employees at the tar works were present; the chair being taken by Mr. H. W. James, who referred to the exceptionally cordial feelings existing between Mr. Field and his men. It had been a characteristic saying of Mr. Field's that Ordnance Wharf was "one big happy family;" and on behalf of this happy family, he had the pleasure of asking its head to accept a mahogany table-bureau in the spirit of the engraved inscription—"To Samuel Sadler Field, a token of respect and affection." To Mrs. Field, who in the past had taken such an active part in their social events, he had the privilege of presenting a handbag of crocodile skin. At the time of his retirement on Sept. 30, Mr. Field had been for 36 years at Ordnance Wharf, of which just over one-half were spent in the service of the South Metropolitan Gas Company.

Report has it that Mr. A. R. DUNCAN, the Coal Controller, is to be the holder of a new and important post under the Shipbuilding Employers' Federation—that of Vice-President.

Mr. W. C. BEARD, of the Bankside works, has been elected an Employee Director of the South Metropolitan Gas Company, to succeed Mr. H. T. Manley. Mr. Beard has been for many years Chairman of the Workmen's Section of the Co-Partnership Committee.

ELECTRICITY SUPPLY MEMORANDA.

IT is perfectly clear from the letter that appeared from Mr. E. W. Dorey in the "JOURNAL" last week, that his strictures of, and revelations concerning, the electric "gasfilled" (formerly known as the "half-watt") lamp have not been to the liking of his electrical compeers. The offending paragraphs appeared in the "Memoranda" for Oct. 27; and the striking feature of what Mr. Dorey had to say, and which furnished the groundwork for our references, was the ardent way in which he sought to show that the "gasfilled" lamps (of the lower orders in some respects, and of the whole class in others) were not the wonderful superiors of the metallic filament lamps that their makers represented them to be. Mr. Dorey did the work he set out to perform with great credit to himself, and advantage to those who might be duped by misrepresentation—so much so that he will not be in certain quarters liked for his candour and truthfulness. Subject to what he said in his letter last week, gas and electrical salesmen and users of electric lamps, should read over the paragraphs in the "Memoranda" for Oct. 27, mark the useful points, and all do their best to assist Mr. Dorey to fulfil the good mission to which he set his mind and hand.

"Gasfilled" Lamp Criticism.

No one can blame the electricity supply industry for making use of all illustration that can be brought together for pushing the domestic uses of electricity, provided the illustration fairly represents the conditions, and sufficient information is given to enable those to whom they appeal to make comparison. This, however, is not often the case; and illustrations obtained from exceptionally favourable conditions are frequently used as being of general application. The result of this is sure to recoil on those who give offence to the canons of propriety in this particular way. There has been quite a large display lately of examples of what is being done picked-up from various quarters; and, as a rule, they do not fairly divulge all that might be said. Not long since Miss E. Walton, the manageress of the showrooms of the Southport Corporation Electricity Department, had a long letter in the "Electrician." Miss Walton, it was plain from this, is a tremendous enthusiast for all-electrical operation. That is quite the proper spirit for one in her position. But reading the letter, if we were not behind the scenes in gas matters, and know what is going on, we might have been pardoned for coming to the conclusion that the Southport Electricity Department was making such progress that the Gas Department was on the downward road to final dissolution. There was one thing Miss Walton did not tell her readers, and that is that the Gas Department have been substituting gas-cookers in a number of cases where people rely on everything being done electrically. It is also very interesting to note that none of the trading concerns owned by the Corporation have been called upon during this financial year to hand over money for the relief of the rates

Unstated Facts.

with the exception of the Gas Department. These little items of information which have a bearing on the question are probably beneath the notice of our fervent lady friend; but they are matters which interest business men. Then removed but a short distance from the meeting of the British Commercial Gas Association, there appeared a letter in the "Sheffield Daily Telegraph," signed "Electron" (which pseudonym suggests association with the electricity industry), which states that his seven-roomed house is operated completely by electricity—heating, cooking, lighting, and even hair-curling and cigar lighting is electrically performed. Since March 6 only about 1200 units of electricity were used in the house. The charge is on the rateable tariff system; and the cost for the seven months has been £8. This cost works out to an average of only 1·6d. per unit. How many places are supplying electrical energy for all purposes at an average of 1·6d. per unit, including lighting? With regard to this figure, it will be noted that the £8 covers seven summer months when very little heating is required. No details are given as to the number of members in the family. Anyway the £8 should visibly swell in the winter. About the 1·6d. Sheffield has recently been discussing the question of an increase in tariffs; and only lately the Lord Mayor said, unless something was done, the department would have a deficit of £160,000 next March. This suggests that the department is doing a pretty big business at a loss. Perhaps part of it is due to consumers who are getting current at an average of 1·6d. for all domestic purposes. One thing "Electron" does acknowledge; and it is that the cost of installation is pretty stiff.

A Cooking Test.

We turn to the "Electrical Review;" and it gives some information about the Billingham housing scheme. A great deal of fuss is being made about what is being done in this case. It is the scheme we referred to last week, which is not one of the ordinary housing schemes, but is being carried out by the Newcastle-upon-Tyne Electric Supply Company for their employees. If the Company cannot make all-electric operation apply, and a success, in the case of their own employees, then no one can. Our conscientious friend the "Review" refers in the article to a demonstration recently carried out, before members of a local housing committee, with the type of electric-cooker that is to be used at Billingham; and it finds the results "interesting." The housing committee must have got somewhat tired; for we see that the cooking of a sirloin of beef, possessing the magnificent weight of 3 lbs. 12 oz., took no less than 1 h. 55 min.—that is to say, the expenditure of time averaged 31 min. per pound of this little joint. For no less than 70 min. of the 115 min., we see the joint was only exposed to low heat, which must have been very low as during that 70 min. only 0·583 unit was expended, or about 29 B.Th.U. per minute. Our dear friend rubs its hands, and says: "An item of particular interest was that the shrinkage of the meat amounted to only 11·7 p.ct., which for frozen meat is a result that could be obtained with no other method of cooking." We are not surprised at the 11·7 p.ct. A 3 lb. 12 oz. sirloin would have to be mighty fat if with the expenditure of electricity named—1·583 units in two hours all but five minutes—and during 70 min. of the time at the low heat mentioned, it lost more than 11·7 p.ct. in weight with any system of heating regulated to the same temperatures as were used in this instance. Then for cooking a Yorkshire pudding and a rhubarb pie (it is not stated how the meat was kept hot while these were cooking), one hour was occupied, and the consumption was 1·09 units. Next we are told that 5 pints of water were "boiled" from cold; and 3½ lbs. of potatoes and two cauliflowers were cooked—the expenditure of electricity being 0·6 unit—making a grand total of 3·27 units. These figures are interesting. The 0·6 unit would be equal to 2052 B.Th.U.; and electric hot-plates, in good condition, are credited with about 40 p.ct. efficiency. Therefore, a little over 800 B.Th.U. would be usefully employed. Five pints of water are equal to 6·25 lbs.; and, starting cold at (say) 48°, 6·25 lbs. of water would require 1025 B.Th.U., *plus* the heat absorbed by the vegetables, and the heat to maintain the boiling. But at 40 p.ct. efficiency, only 800 B.Th.U. would (as seen above) be usefully employed out of the 2052 B.Th.U. expended; while to raise the water to boiling would alone require 1025 B.Th.U. This would mean 50 p.ct. efficiency. The cauliflowers were cooked in the boiler; and the potatoes were steamed over it. The cooking of the vegetables also took an hour; and the "steaming" shows that the water had to be kept at boiling-point. We cannot reconcile the consumption with the performance.

The Electric Iron and the Lighting Circuit.

We have heard on various occasions that one of the troubles that proprietors of hotels and residential houses have to contend against is the growing surreptitious use by visitors of electric-irons off the lighting circuit in the bedrooms. With lighting current at the present price per unit, this covert work helps to swell the proprietor's account for light. With laundry charges what they are, the practice is increasing of washing and ironing small articles (such as blouses, lace, and handkerchiefs) in bedrooms; and a little pressing of clothes is also indulged in. It is understood that, owing to this pilfering of current, some proprietors make it a practice of shutting-off the current during the hours of daylight. Another way of overcoming the trouble has been suggested by a firm of electrical contractors; and the "Electrician" says they are to be "commended on their initiative in putting forward a concrete suggestion to hotel proprietors, which should prove to be a sound advertisement of the advantages of electricity. All that the "concrete" suggestion amounts to is that proprietors of hotels and other residential places should provide for the use of guests an electric ironing-room, equipped with benches and wall plugs and electric irons. Current so used could be taken at "heating rates;" and if it was not thought advisable to provide this service free, a small hourly charge could be made for the use of the ironing-room. If only a small hourly charge was made, there would still be a number of guests who would be actuated by pride and cost to prefer the privacy of their own rooms for the washing and ironing. The ironing-room might become a little white elephant.

Supplying Rural Areas.

The electrical papers have been (as mentioned last week) giving Hereford a large amount of publicity for the work the Electricity Department has been doing in developing electricity supply in rural areas by means of overhead transmission. It is obvious that the Electrical Engineer (Mr. Kerr) has adopted a policy that will have a continuous revenue-accruing effect, though we shall be interested to see what sort of balance will be in evidence when all charges are satisfied. In one instalment of the voluminous descriptive reports, we see that wayleaves for 46 miles of overhead lines have been signed and sealed; and the network has been developed gradually from point to point. The principle that Mr. Kerr appears to have adopted is that the thin end of the wedge is worth getting in, so as to make the use of electricity as universal as possible. For instance, it is said that in the rural areas the houses supplied range from cottages to mansions, in the latter of which about 20 KW. of apparatus is installed. In the cottages current is used almost exclusively for lighting; and a fixed price for unlimited hours is charged. "This part of the load," it is remarked, "is probably not very remunerative; but it amounts to a very small fraction of the total, and is worth taking in, so as to make the use of electricity universal." High-pressure gas-pipes are not being made so much use of as they should be to bring outlying districts within gas-supply areas.

Cable Breakdowns.

With the coming of large electric power stations, the extension of distribution systems, and the dependence of large blocks of industrial power on the one source of supply, the anxieties of the responsible electrical engineer must be greatly increased. The "Electrician" calls attention to this matter in some comments on faults on large power systems. It states that, with the growth of power supply stations, there has been increased study of "the phenomena which take place when many thousand horse power are being generated and transmitted, and of the means that should be taken to reduce what may easily [mark the "easily!"] be the disastrous effect of a short-circuit or bad fault on such systems to a minimum." It explains the usual methods for diminishing the trouble by automatic isolation, or sectionalization, and the introduction of a reactance into the circuit so as to limit the surges which may occur to such a level as will prevent them having a dangerous effect on the machines or network. But with all that is done, and with all the study, actual faults are sometimes accompanied by "curious manifestations." The breakdowns that still occur, and put out of gear many works in the district affected, show that the solution of how to prevent positively these mishaps has not yet been discovered. We have no interest in discussing causes here; the fact that it is so goes the length of the concern of our readers. We see a paragraph in the "Electrical Review," which states that a great part of the cables supplying the Derby works of the Midland Railway was destroyed by fire about the middle of October, and that this resulted in some 9000 employees having to stand idle, chiefly in the engineering department. In another quarter it is observed that a portion of Leeds was deprived of electricity supply on the afternoon of Oct. 13, owing to the breakdown of a transformer in one of the substations. The plant was brought to a standstill by an explosion, which followed. Some districts were without current for two hours. Through a breakdown at the Lancaster Corporation Electricity Works, about seven o'clock last Sunday week, the religious services in the borough, including a soldiers' memorial service in the parish church, were suddenly thrown into darkness. Candles were used during the sermons. The proclivity of electrical plant to create interruptions of supply has not yet been conquered.

An Order has been issued by the Ministry of Health, under the Temporary Increase of Charges Act, authorizing the Blackburn Corporation to increase the maximum price charged for gas from 5s. to 6s. per 1000 c.ft.

A visit has been arranged for next Friday afternoon of members of the London and Southern District Junior Gas Association to the Queen Victoria Street show-rooms and offices of the Richmond Gas Stove and Meter Company, Ltd.; and for the occasion, Mr. H. M. Thornton (Managing-Director) has drawn-up a full programme of great interest. The next business meeting of the Association is on Friday, the 26th inst., when Mr. Fred S. Larkin, Assoc.M.Inst.Mech.E., of the Gas Light and Coke Company, will read some notes on the "Effect of Burners and Bars on the Efficiency of the Gas-Cooker Hot-Plate."

A GRAPHIC METHOD FOR SLIDING-SCALE CALCULATIONS.

By H. R. ASKEW, A.M.Inst.C.E., B.Sc.Eng., A.C.G.I., &c.

[COPYRIGHT.]

WHATEVER revision of a company's financial position is made by the Board of Trade under the new Act, the sliding-scale will necessarily be modified. Apart from complete changes of the whole basis on which dividends are paid—such as the South Metropolitan scheme—Orders under section 1 of the Act will also involve an alteration of it. In the first place, the slide will now be in fractions (or decimals) of a penny per therm. Secondly, the effect that a new standard price will have on the finances of a company depends on the sliding-scale that is to be adopted with it. One of the first assumptions to be made in fact, in deciding on a method of arriving at the new standard price, is as to the amount of the new slide.

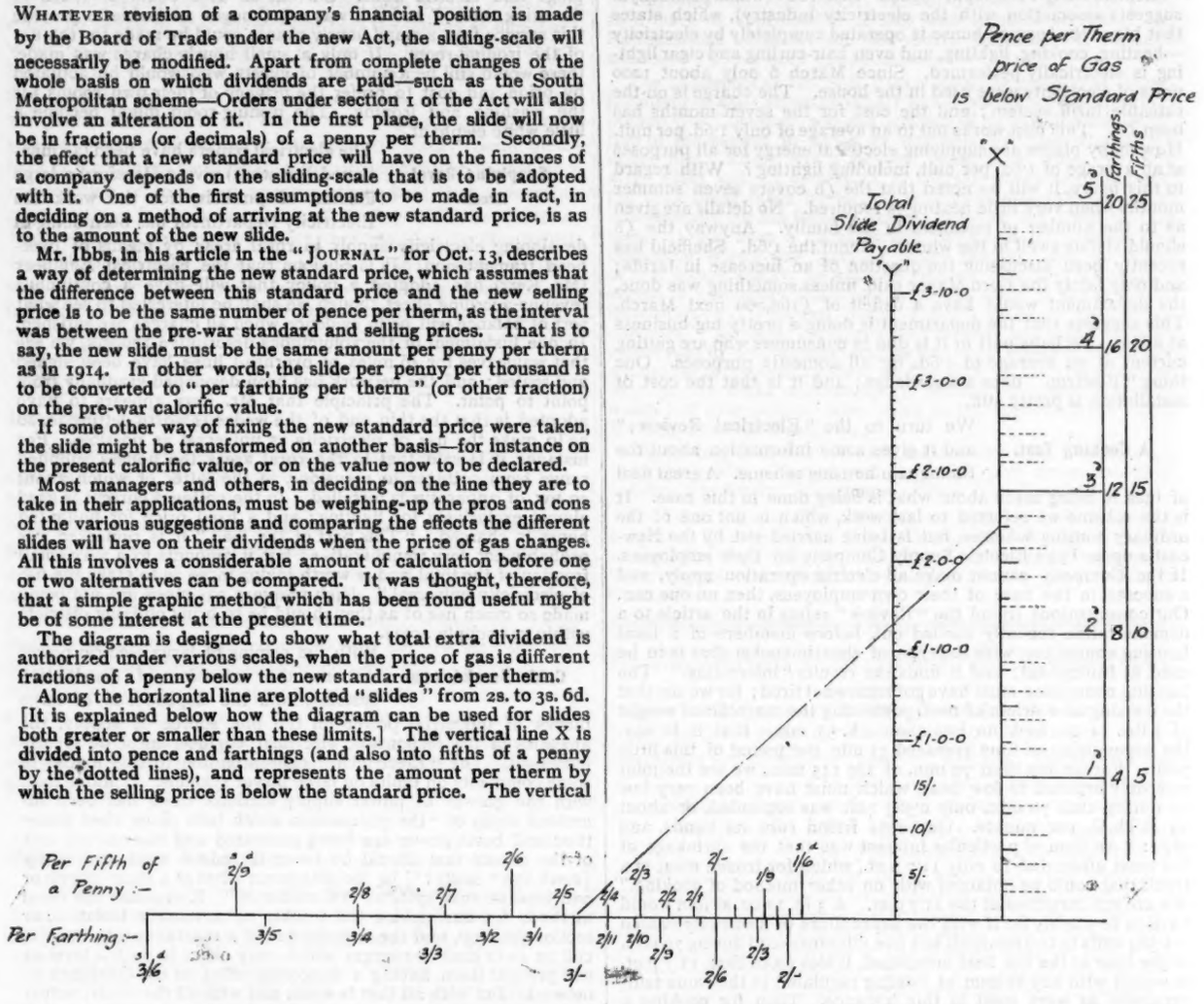
Mr. Ibbs, in his article in the "JOURNAL" for Oct. 13, describes a way of determining the new standard price, which assumes that the difference between this standard price and the new selling price is to be the same number of pence per therm, as the interval was between the pre-war standard and selling prices. That is to say, the new slide must be the same amount per penny per therm as in 1914. In other words, the slide per penny per thousand is to be converted to "per farthing per therm" (or other fraction) on the pre-war calorific value.

If some other way of fixing the new standard price were taken, the slide might be transformed on another basis—for instance on the present calorific value, or on the value now to be declared.

Most managers and others, in deciding on the line they are to take in their applications, must be weighing-up the pros and cons of the various suggestions and comparing the effects the different slides will have on their dividends when the price of gas changes. All this involves a considerable amount of calculation before one or two alternatives can be compared. It was thought, therefore, that a simple graphic method which has been found useful might be of some interest at the present time.

The diagram is designed to show what total extra dividend is authorized under various scales, when the price of gas is different fractions of a penny below the new standard price per therm.

Along the horizontal line are plotted "slides" from 2s. to 3s. 6d. [It is explained below how the diagram can be used for slides both greater or smaller than these limits.] The vertical line X is divided into pence and farthings (and also into fifths of a penny by the dotted lines), and represents the amount per therm by which the selling price is below the standard price. The vertical



AMOUNT OF SLIDE IN DIVIDENDS PER CENT. FOR EVERY CHANGE IN PRICE OF GAS.

line Y, divided into pounds and shillings, gives the total extra dividend (above the standard dividend) payable under the sliding-scale.

The method of using the diagram is as follows: A straight-edge is placed diagonally across it, from the point on the horizontal scale corresponding to the amount of the unit slide, to the point on the vertical line X corresponding to the number of pence and fractions of a penny the selling price is below the standard price per therm. The point where the straight-edge cuts the vertical line Y gives the total "slide" dividend payable.

Example: The new sliding-scale is to be 3s. per farthing per therm. *Query:* What "slide" dividend will be payable when gas is sold at 2¾d. below the new standard price? The dotted diagonal line shows how a straight-edge should be placed across the diagram, and the answer (read off on the line Y) is £1 13s. 0d. p.ct. If, for instance, the standard dividend is 4 p.ct., the total dividend payable will be £4, *plus* £1 13s. 0d., or £5 13s. 0d.

Note: When the dividends change with every variation of a fifth of a penny per therm, the point on the horizontal line to which the straight-edge must be set is to be taken from the upper scale; and when dividends change for every farthing per therm, from the lower scale.

The diagram is equally applicable, of course, for showing the drop in dividends when the price of gas rises above the standard price; and the method of using is the same.

The diagram can be used for slides greater or less than the limits shown, by setting the straight-edge to a slide of half, or double, the actual slide, and doubling or halving the total dividend obtained on the line Y. In the example given above, if the actual slide under consideration had been 1s. 6d. per farthing per therm, the figure of £1 13s. obtained by using the slide value 3s. in the diagram should be halved—giving 16s. 6d. as the answer, and the total dividend payable as £4 16s. 6d.

Similarly, to find the extra dividend payable under a slide of 5s., the straight-edge should be set to 2s. 6d. in the diagram, an the figure obtained from the line Y doubled.

To convert a slide in shillings and pence per penny per thousand to a therm basis, the following formula should be used:

If P = number of pence in the original slide
V = calorific value (in B.Th.U. per c.ft.), on which the slide is to be converted.

Then the new slide in pence per farthing per therm $= \frac{PV}{400}$;

and in pence per fifth of a penny per therm $= \frac{PV}{500}$.

[*** The writer is shortly publishing a small handbook dealing with some of the problems that will arise in changing-over to a therm basis, where the question of sliding-scale calculations will be more fully treated.]

At an extra general meeting of the Institution of Mechanical Engineers on Friday, Dec. 3, the subject of the "Human Factor in Industry" is to be further discussed.

The Berlin Correspondent of "The Times" says that, according to the journal "Elektrizität," interesting experiments for the manufacture of artificial coal are being made with vegetable refuse from peat beds, of which Germany possesses a great number. An engineer named Bauschleicher has succeeded in manufacturing by a perfectly simple process artificial coal of great heating capacity. It can be made from peat in a wet state, which has been taken direct from the cutting. The new fuel, which is called "gasol-coal," burns with a bright flame, and is suitable for use with wood or other fuel. It is also possible by this process to manufacture coke of lower heating capacity.

MANCHESTER DISTRICT EXECUTIVE BOARD.

National Gas Council.

THE Annual Meeting of the Manchester District Executive Board of the National Gas Council was held on Tuesday of last week in the Town Hall, Manchester. Alderman F. S. Phillips, J.P., presided; and Mr. E. J. Fottrell and Mr. S. S. Ogilvie were in attendance.

The Chairman reviewed at some length the work of the District Committee during the past year, and moved the adoption of the annual report, which was carried unanimously.

The report stated that the membership of the Manchester District Board now includes 100 undertakings, which is an increase of 23 over a year ago. The membership for Lancashire and Cheshire represents 97 p.ct. of the total make of gas in the two counties. The two members appointed for the district to act on the Special Central Committee submitted a lengthy report on the subject of the standardization of cookers, which was approved and adopted by the District Executive Board, and passed on to the Central Committee as representing the views of the Manchester district. The Committee have acted in conjunction with the Commercial Section of the Institution of Gas Engineers in obtaining certain amendments to the original Gas Regulation Bill, and in securing the support of local members of Parliament. In particular, the industry in this area is greatly indebted to Major Nall, M.P., for his services in this connection. The district have selected the four cases to make first application for an Order under the Act. A Special Coal Sub-Committee for the district were appointed to act and consult from time to time with the several District Coal and Coke Supplies Committees as to the coal position generally in the area. Protests have been made against the introduction of new selling agencies in the coal industry, having regard to the fact that there is no surplus coal requiring additional organizations for facilitating distribution. But further action is suspended owing to the position in the mining industry. It is not intended to allow the matter to drop. The Committee regretted that Mr. W. Whatmough has found the pressure of business so great that he has been compelled to resign from the Central Executive Board and the Management Committee.

The following appointments were made: Chairman, Alderman W. Kay, J.P. (Manchester); Vice-Chairman, Alderman F. S. Phillips, J.P. (Salford); Representative on the Central Executive Board, Mr. F. A. Pye (Chester), in the place of Mr. Whatmough, resigned; Secretary, Mr. J. H. Sillitoe (Manchester).

The following undertakings were elected, by ballot, to appoint representatives to the Management Committee: Birkenhead, Bolton, Burnley, Chester, Colwyn Bay, Liverpool, Oldham, Preston, Radcliffe, Rochdale, Runcorn, Stockport.

Mr. Fottrell then outlined the proceedings to be taken for Orders under the Gas Regulation Act, 1920.

FEDERATION OF GAS EMPLOYERS.

(MANCHESTER DISTRICT.)

THE Annual Meeting of the Manchester District Committee of the Federation of Gas Employers was held on Tuesday of last week, at the Town Hall, Manchester. Alderman F. S. Phillips presided; and Mr. S. S. Ogilvie and Mr. E. J. Fottrell were in attendance.

The Chairman reviewed the work of the district during the past year, and drew attention to the heavy call which had been made on the members of the Management Committee in attending so many meetings, which had to be called, on occasion, at inconvenient times.

The following appointments were made: Chairman, Alderman F. S. Phillips, J.P. (Salford); Vice-Chairman, Alderman William Kay, J.P. (Manchester); representative on the Central Committee: Mr. S. Tagg (Preston), in place of Mr. W. Whatmough, resigned; Secretary, Mr. J. H. Sillitoe (Manchester).

The following undertakings were elected by ballot to be represented on the Management Committee: Birkenhead, Bolton, Burnley, Chester, Colwyn Bay, Liverpool, Oldham, Preston, Radcliffe, Rochdale, Runcorn, Stockport.

Mr. S. S. Ogilvie dealt with the work of the Federation from a national point of view, and urged the need of closer organization in order to meet the solidarity which labour was gaining through the trade union amalgamations.

Oil Gas at Roma, Queensland.—At the Queensland Government oil-bore at Roma, an unexpected development occurred when a strong flow of gas was released. The pressure of gas is said to be so great that water from the well is being forced a distance of about 40 ft. above the opening. The odour of the oil is detectable in the gas.

Chairmanship of the Gas Companies' Protection Association.—Following the annual meeting of the Association last Thursday week, when Mr. H. E. Jones intimated a desire to modify his activities, the Deputy-Chairman, Dr. Charles Carpenter, was elected Chairman, and Mr. R. W. Edwards, of Aldershot, Deputy-Chairman of the Association.

OUR COALFIELDS.*

SEEING how much this country owes to its coalfields, and the universal nature of the dependence upon coal, the subject is one in which wide interest should be taken; and Dr. Walcot Gibson will doubtless amply realize his hope for a wider circle of readers than mining engineers, mine owners, and mining students for his book, just published, dealing with the composition, structure, and resources of the coalfields, visible and concealed, of Great Britain. The earlier chapters, introductory to the main purpose of the book, are reproduced, with many additions, from his work on the "Geology of Coal and Coal Mining," which formed the first volume [now out of print] of Arnold's Geological Series.

Following these eight general chapters are fifteen others, each of which is devoted to one or more separate coalfields. These, the author says, are in part a condensation of personal experience and observations in the fields during a period of thirty years, and of facts collected from various publications. The matter is both conveniently and concisely arranged. Taking, for example, the chapter on the coalfields of Durham and Northumberland, we find first a brief explanation of the formation, and a statement of the net available reserves in the coal measures—which for the coal measures in Durham county are estimated at 5,271,116,346 tons. The seams and their thicknesses are quoted, and one or two analyses of the coals reproduced. South Wales naturally occupies a considerable section, and so do the coalfields of Scotland. In another portion of the book it is stated that early "anticipations have been realized in the now well-known concealed coalfield of Kent, but with its boundaries so ill-defined that in 1905 it was found impossible to make any estimate of the amount of coal likely to exist, though recently computed at over 2,000,000,000 tons."

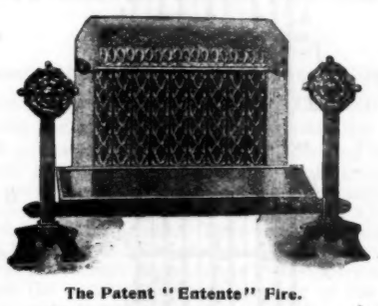
Apart from the numerous illustrations which accompany the matter in the general portion of the work, Dr. Gibson includes a sketch map of each individual coalfield, and numerous other drawings. Glancing through the pages of the book there is everywhere found evidence of the conciseness already remarked upon. If what an inquirer may be in search of is contained in the book, he should experience little difficulty in placing his finger upon it, even without the aid of the very full index that is available. This is a point in favour of Dr. Gibson's work, the importance of which is not likely to be overlooked.

* "Coal in Great Britain," by Walcot Gibson, D.Sc., F.G.S. London: Edward Arnold; 1920. Price, 21s. net.

"MAIN" GAS-FIRES.

THE winter season lists, which are now ready, of Messrs. R. & A. Main, Ltd., contain illustrations and particulars of many attractive gas-fire designs and new features.

In view of the great demand for their "Entente" inset gas-fire, this is the subject of a special list, which explains fully its construction and application to different types of grates. The salient feature of the "Entente" is that it can be adjusted to suit grates of varying heights and depths, thus ensuring a neat workmanlike fit. It is, in fact, as the firm say, a complete "entente" between the fire and the interior grate in which it is placed. Both burner



The Patent "Entente" Fire.

and injector are constructed on entirely new principles, embodying the latest Main patents, the object of which is to produce an absolutely silent and intense flame. There is also a separate list for their new "Poet" series of coal or gas interiors. These interiors, while being very satisfactory when used with solid fuel, are specially designed with a view to their ultimate conversion to gas by means of such inset gas-fires as the "Entente."

The policy to be pursued with regard to prices has been the subject of careful study. Earlier in the year it was foreshadowed that, if costs continued to increase, a further advance in prices would be necessitated. Messrs. Main made thorough independent investigation of the matter. They found there was still an upward trend in wages and materials, and that the margin of profit on certain lines was negligible. Fully comprehending the disturbing effects of frequent advances, and the difficulties encountered by their friends in readjusting terms to the public, they decided early in the season to postpone the matter for the time being. This will allow their clients to make their arrangements

for the ensuing season with more freedom, and—bearing in mind the relation of output to cost—it is hoped will be mutually advantageous in the end.

A NEW PATENT AIR-HEATER.

Mr. F. W. J. Belton's Invention.

THE accompanying photograph is of an experimental air-heater made to a design patented by Mr. Francis W. J. Belton, Gas Engineer and Manager to the Corporation of Macclesfield. The apparatus was originally conceived in response to an inquiry for an appliance, gas heated, to supply pure hot air, free from products of combustion, for cloth drying; but it can be put to many other uses where pure hot air is required. It is segmental in construction, and so can be built-up to any size to suit any required capacity.

Tests of the experimental apparatus (unlagged) gave a thermal efficiency of 87½ p.ct. The apparatus under test (shown in the photograph) was of a size calculated to heat 30,000 c.ft. of air per hour to 80° C.; but the fan used in the test would only pass 17,760 c.ft. of air per hour. So that, if the proper quantity of air had been passed, the thermal efficiency would have been higher still. The details of the test are:

Volume of air passed per hour	17,760 c.ft.
Inlet temperature of air . .	50° Fahr.
Outlet ,, ,, . .	325° ,,
Rise in temperature . . .	275° ,,
Heat absorbed	66,992 B.Th.U.
Specific gravity of air C.V. .	·1686
Gas used	180 c.ft. per hour
Calorific value	425 B.Th.U. per c.ft.
Thermal efficiency . . .	87·5 p.ct.

The apparatus is being manufactured by Messrs. Fletcher Russell & Co., Ltd.

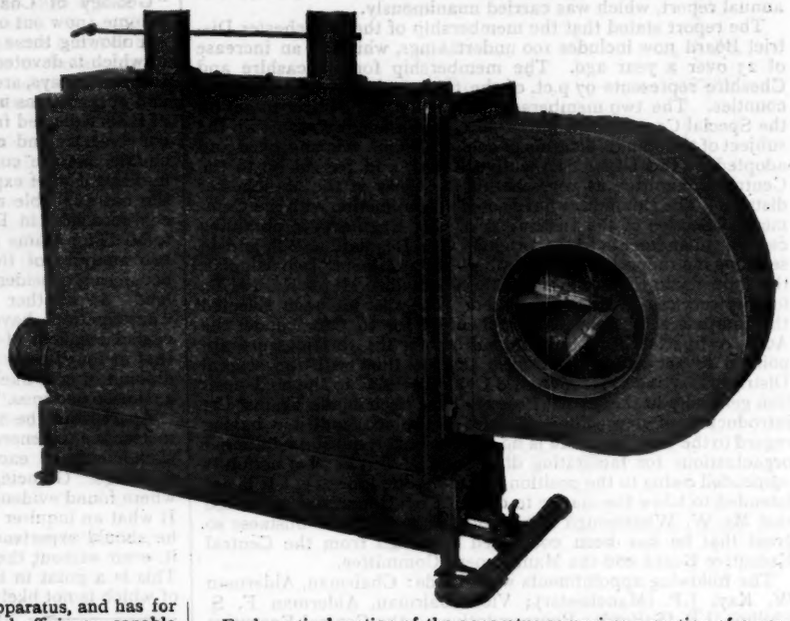
The following is an extract of patent specification No. 142,638, relating to the invention.

This invention relates to air or gas heating apparatus, and has for its object to provide a heater having high thermal efficiency, capable of ready assembly, and in which the air being heated is maintained free from contamination by the products of combustion of the heating gas. The heater contains a number of sections, each comprising a length of duct without joints for the heating gases, with a portion of an air passage at each side of the duct; the sections being arranged side by side, and also one upon another, and causing the air being heated to travel through the apparatus in a number of streams at high velocity, back and forth in horizontal channels.

Figs. 1 and 2 are sectional views taken at right angles to one another; and fig. 3 is a sectional plan.

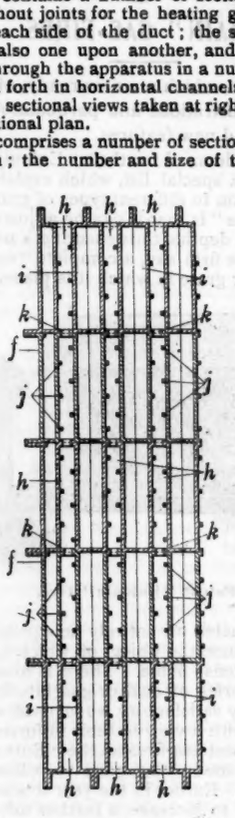
The apparatus comprises a number of sections which can be readily placed in position; the number and size of the sections determining the capacity of the apparatus. The sections are built up side by side, and also one upon another, and placed between end sections *b* and *c* containing the air-transfer passages, and the inlet and outlet *d* and *e* respectively, and between side-plates *f*. The top and bottom sections also of the apparatus are provided with flanges, as shown, whereby the adjacent sections are united.

The air which enters at the top, and passes in a number of streams, moves with high velocity back and forth in horizontal channels on its way to the outlet *e* at the bottom; while the products of combustion from the gas-burners *g* (fig. 2), which extend under the apparatus, rise through narrow vertical ducts *h* disposed between the air channels *i*. Horizontal ribs *j* are provided, which project into the vertical gas-ducts to cause the gases to have a circuitous path and to give-up their heat very effectively to the walls of the air channels.



Each vertical section of the apparatus comprises a portion of a vertical gas-duct for the hot gases with a portion of two air-heating channels at each side of the portion of the gas-duct. The superposed sections bed one upon the other; the projecting edge *k* around the gas channel in each section entering within, and forming a positioning piece for, the section above. The flanges upon the end, and the side sections which are bolted together, hold the structure together as a unit. The projecting edges *k* form a good joint with the parts of the sections which seat therearound, so as to prevent the products of combustion gaining access to the air-space of the heater.

The gas-burners may be of either the high-pressure or the low-pressure type, and extend the full width of the apparatus—one row of burners being disposed beneath each of the vertical gas passages *h*.



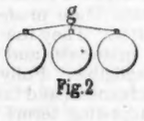


Fig.2

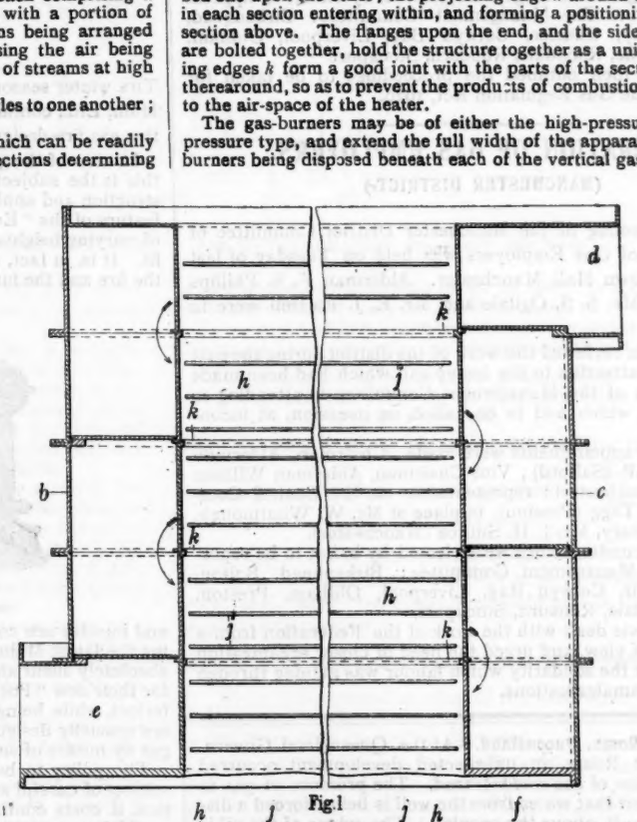


Fig.1

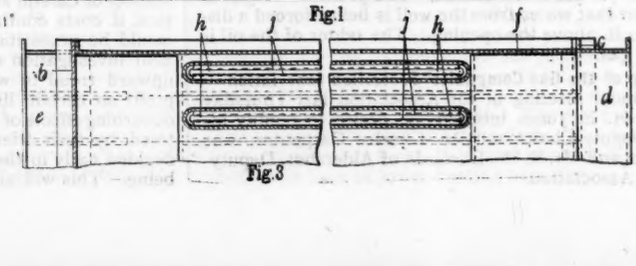


Fig.3

MANCHESTER AND DISTRICT JUNIOR GAS ASSOCIATION.

Visit to Messrs. J. & J. Braddock's Meter Works.

Members of the Manchester and District Junior Gas Association on Thursday last visited the Globe Meter-Works at Oldham. The party, numbering 68, were received by Mr. G. H. Braddock (the Managing-Director) and Mr. J. Berry (the Works Manager), and conducted over the works by the following gentlemen, in addition to those previously named: Mr. R. E. Braddock (Director), and Messrs. J. Taylor, W. T. Glover, R. Flower, J. A. Maylor, and T. C. Braddock.

In the assembly room were models and actual samples of the firm's productions—wet and dry meters with glass fronts and backs, retort-house governors, water-loading governors, Gordon patent hydraulic damper regulator for steam-boilers, also an automatic semi-solid lubricator for steam-engines, exhausters, &c.

The PRESIDENT (Mr. J. Bridge), in opening the proceedings, said that they were holding the third meeting of the session, and as far as attendance went it was a record one, and was an indication of the honour they had bestowed upon them by being invited to the works. Messrs. Braddock had a high reputation; and he was sure that it was justly deserved.

Mr. J. BERRY (the Works Manager), in welcoming the members on behalf of the Directors, mentioned one or two special features that would be noticed on going through the workshops. All the works machinery is driven by gas-engines. In the brass foundry were four 150-lb. gas furnaces; all chilling was done by gas; and the tinmen's stoves were heated by gas, which was governed-down to 11-10ths. The total gas used was about 12 million cubic feet under the system of shorter hours; while under former conditions the consumption was from 13 to 15 millions.

The party were then taken by their respective guides round the works, and into the station meter department, wet meter department, brass foundry, and other workshops, &c. They were shown a high-pressure meter having 5 lbs. pressure on the inlet and 3 in. of water on the outlet, working accurately alongside a standard test meter. In the station meter department was one large meter in course of erection; and the following particulars were furnished: Capacity, 175,000 c.ft. per hour; weight of meter, 64 tons 7 cwt.; weight of water, 143 tons—a total weight on the foundations of 207 tons 7 cwt. The tin-plate working, the method of wiring and fastening of the meter leathers (without any stitching), called forth remarks of admiration, as also the powerful presses and stamping machinery. The seasoning and testing of the leathers proved exceedingly interesting.

The firm have some very good automatic machinery installed for dealing with the various meter parts.

AN INTERVAL FOR TEA.

At the conclusion of the visit, high tea was provided for the visitors, after which the PRESIDENT, in calling for a vote of thanks, mentioned that it was ten years since the Association paid a visit to these works, and mentioned it was the first visit to be reported in the "Joint Transactions" of the English Junior Gas Associations.

Mr. R. H. GINMAN (Leek) moved a vote of thanks to Messrs. J. & J. Braddock, also to Mr. Duxbury and his Chairman, for their kindly interest in providing a room for the tea and the meeting. He was sure that all would have received hints that would guide them, and be of use to them in the future. He called attention to the fact that they had with them that afternoon Mr. Oldfield, one of their late Secretaries, who was over on a visit from Australia, and to whom they extended a hearty welcome.

Mr. SMITH (Whitworth) seconded the vote, which was carried with acclamation.

Mr. G. H. BRADDOCK, in thanking the members for their expression of appreciation, said he hoped that they would all receive benefit from their visit. The firm had a large amount of work in progress; and while it looked from what the visitors had seen that afternoon that there should not be a shortage of finished meters, still at times it was unavoidable, on account of scarcity of material in some department.

Relative Advantages of Wet and Dry Meters.

Mr. J. BERRY (Messrs. J. & J. Braddock) opened a discussion on the relative advantages of wet and dry gas-meters. He called attention to the fact that the principle of the wet meter was the same as when Mr. Clegg invented it. The wet meter was heavy, and had often to be watered. It was also somewhat messy and smelly, and had to be watched against freezing in winter. The wet meter, on the other hand, was the most reliable of meters for registration. In regard to the dry meter, it was self-contained and light; and here, again, the principle was the same as it was forty years ago. The diaphragm was the most vital part. The skins for this had to be the best, and specially prepared, oiled, and seasoned; and the slide valve had to be a perfect fit, and made so that it would not lift up, or the meter would pass gas without registering. He spoke about the drying of the leathers, which allowed of errors in registration to creep in, and was of the opinion that the gas that was being sent out at the present time had something to do with it. The deposits that were found in meters caused a considerable amount of trouble to them as manufacturers. On this particular matter there was room for some research work.

Mr. STEWART (Rochdale) favoured the wet meter, and spoke of the ease of repair without a highly skilled man being required. He also mentioned that the spraying of the dry meters every three years appeared to be essential.

Mr. DIXON (Lancaster) said that out of 250 wet meters only eight had proved faulty. In the case of dry meters he had tested at the same time, of 122 tested 46 had proved faulty. He was of opinion that the lower-grade gas accounted for some of the faults in the dry meter, and had something to do with the leakage. In regard to the condition of meters coming in now, perhaps the meter repairer could, by comparing those he had pre-war with those he was now dealing with, see or account for the trouble, as the gas sent out then was not of so low a grade as now.

Mr. BATTERSBY (Bury) was of opinion that it was owing to the dry state of the leathers that they had so much leakage. He believed it was better to spray the gas. He also mentioned the fact that it was a common practice in some places to overload the meters—a practice which he condemned.

Mr. CLEGG (Burnley) remarked that Burnley had 29,296 meters, a very small percentage of which were dry. The chief reason for advocating wet meters was accuracy of registration, which, he felt sure, was reflected in the following figures of unaccounted-for gas in Burnley: 1913-14, 2·77 p.ct.; 1914-15, 3·71 p.ct.; 1915-16, 4·02 p.ct.; 1916-17, 2·55 p.ct.; 1917-18, 3·64 p.ct.; 1918-19, 2·78 p.ct.; 1919-20, 3·64 p.ct.—average, 3·31 p.ct. Burnley was a mining town; and assuming that the average unaccounted-for gas in similar districts to Burnley where dry meters were predominant was 6 p.ct., the saving to the department on last year's make was 2·69 p.ct., or 21,800,000 c.ft. of gas, which valued at last year's average price for gas of 46d. per 1000 c.ft. was equal to £4178. The argument as to the capital cost of a wet meter being higher than a dry meter redounded to the credit of the wet meter upon being closely looked into. Assuming the average life of a wet meter was 40 years, and of a dry meter 20 years, and the present cost of a 5-light wet meter was £4 17s., and of a 5-light dry meter £3 13s. 6d. (a 5-light being taken as the most common size), and assuming that 29,000 meters were purchased at the above figures, the cost would be in each case: Wet, £140,650, dry, £106,575. The interest and sinking fund necessary to wipe-out the debt in a term corresponding to the life of the meter would be £8552 for drys, and £8192 for wets; the annual charge thus being a balance of £360 per annum in favour of wet meters—taking 5 p.ct. interest in each case. It might be asserted that much more labour was required for watering. They had 14 meter inspectors, who read the indices at the end of the quarter, and watered the meters four times yearly—about mid-quarter. These men also attended to complaints, removals, and grease taps in their own districts. Thus, he thought, there would not be a saving of more than five men if dry meters were in vogue. The wages of these men would amount in the aggregate to £994. A large portion of this sum would be swallowed up by the extra amount of labour required in repairing defective dry meters. However, ignoring this point, there was still, on the figures given, a saving of £3544.

Mr. BERRY, in reply to the discussion, gave the reasons why the dry meter was liable to be slow, and spoke against the overload on the meter. The fact that a wet meter was the one accepted as the test meter was a fair proof of the value of this type. They as makers had, however, to make both kinds to meet the demand of the gas profession.

Mr. BRIDGE thanked Mr. Berry for his work that afternoon, and for opening up the discussion, to which Mr. Berry replied.

A VISIT TO MESSRS. ALDER AND MACKAY'S WORKS.

By the Scottish Junior Gas Association (Western District).

The members of the Western District of the Scottish Junior Gas Association had an opportunity on Saturday last of paying a visit to the gas-meter works of Messrs. Alder and Mackay, in Stewart Street, Edinburgh. Travelling by train from Glasgow and various towns in the West of Scotland, they arrived at the works a company numbering about fifty, including a fair sprinkling of the seniors, at 3 o'clock. They were welcomed by Mr. Hutton, the Chairman, and Directors of the Company, and were conducted over the various departments by members of the staff, who explained the construction and working of the machines used in the manufacture of gas-meters and other appliances for which the firm are known all over the world.

The present works were built in the year 1890 from designs of the late Mr. John H. Bennet; and they were specially planned for the accommodation of a business devoted to the manufacture of gas-meters. Apart from the ordinary wet and dry meters, which form the bulk of the manufacture, the firm have had the advantage of producing several specialities, such as the cast-iron case dry meter, of which they were the original makers under a patent of 1864, Green's patent underground wet meters for outdoor purposes, cylindrical station meters, and the slot meter with its detachable apparatus all contained in a small frame over the cash-box. The chief speciality, however, was the "A. & M." patent pressure wave automatic controller for street gas lighting, operated direct either from the gas-works or district governor. The principle of this controller was explained by means of a model encased in glass, and practical example was given of lighting and extinguishing one, two, and three lights. The firm are also manufacturing

to a considerable extent hurricane proof street gas lanterns, made in copper. The visitors were impressed with the thorough and practical manner in which each department was laid out, and the cleanliness of the whole factory. In the various tinsmiths' shops dry meters were seen being made up from the foundation until they reached the finishing shop.

Passing through the various departments, an opportunity was afforded for seeing some specially constructed machines and tools. In the drilling shop were seen various types of vertical drilling machines used in connection with the manufacture of the cast-iron dry meters; in the brass-moulding shop, power and hand-press moulding machines, together with the 600-lb. tilting gas-furnace, and a 400-lb. tilting coke-furnace; in the various brass-finishing departments, many types of capstan lathes; and in the index department, various wire-feed lathes. In the engineering department there were several power presses for stamping work, also a drawing press for the manufacture of the pressure wave automatic controllers. Several Brown and Sharpe full automatic machines are used for the manufacture of small brass parts; while the blacksmith was altogether independent, using the Blacker mechanical hammer.

After leaving the various departments enumerated, where throughout several test holders were used for testing the meters in their different stages, the visitors passed forward into the painting shop, where "Airostyle" painting machines are used. In the packing department, an overhead runway is in operation for lifting the boxes direct on to the railway lorries. A "goods received" department, with ample accommodation, is also provided for unpacking cases, recording, and washing meters received for repairs before passing forward to the several workshops.

The whole factory is lighted by means of Keith-Blackman high-pressure 60 c.p. lamps, and is fitted throughout with Mather and Platt "Grinnell" sprinklers for use in the event of fire.

THE VISITORS AT TEA.

At the conclusion of the inspection, char-a-bancs were waiting to convey the company to F. and F.'s Restaurant, where the Directors entertained them to high tea.

Mr. HUTTON, who presided, in welcoming them in the name of the Directors of the Company, expressed regret that the change in the train arrangements had probably prevented a larger number from being with them. They had seen the processes they were working and the methods which they were trying to adopt to meet the views of the industry in regard to the production of measuring instruments that would fulfil the purpose accurately. This was one of the most important factors in their business; and they were determined to keep it at its highest point. He invited suggestions from the Association, and said these would be considered by them with the view to keep their methods up to date. He compared the position of the gas industry as he remembered it 35 or 40 years ago with what it was now. There was a great divergence of opinion as to the claims of vertical and horizontal retorts; but it was not for him to express an opinion on this point. Their business was to make instruments of measurement that would be accurate in every detail, and meet the present situation. There was only one purpose to be served, and that was that there should be co-operation between the gas industry, as producers, and themselves, as meter manufacturers. He concluded by wishing continued success to the Western District of the Scottish Junior Gas Association.

Mr. JOHN JAMIESON (the President), on behalf of the Association, thanked Mr. Hutton and the Directors for the very generous way in which they had entertained them, and said the visit had been a most instructive one.

Songs and recitations beguiled an hour of waiting before making the return journey.

TRAINING AND REMUNERATION OF ENGINEERS.

The opening paragraphs of the Presidential Address of Mr. John A. Brodie to the Institution of Civil Engineers, which was delivered on Tuesday of last week, had reference to the training of young engineers who intend to enter the municipal branch of the profession, and to the equally important subject of adequate remuneration. He emphasized the importance of the young engineer having, at an early stage of his training, a period of workshop and outside works' experience in some of the branches of engineering which involve the use of constructional materials of various classes. Not only does he learn in a thorough manner the qualities of materials, the processes of manipulation, and approved methods of carrying out work generally, but he has opportunities of coming in contact on an intimate and friendly footing with workmen. In this way he learns to appreciate their point of view, as well as the conditions under which they work. Experience of this character should assist him towards becoming a sound judge of character, and enable him subsequently to pick out the right types of men for positions under him. At the same time, of course, it was not suggested that this practical training should be at the expense of scientific education. The wise young engineer, said Mr. Brodie, will, while giving due attention to practical work, take care he does not allow his theoretical training to come to a standstill, or his general knowledge to rust.

Coming to the second point, the President rightly argued that, if men are to be fully trained and competent, they should be adequately paid. It cannot, he thinks, be said that satisfactory rates of remuneration are paid to the younger members of the profession generally. A great many of the most promising young professional men go abroad, as openings with reasonable remuneration and prospects of advancement are difficult to find at home; while many fully-trained and competent young engineers are also lost to the profession through finding it necessary to take-up other lines of business in which more liberal remuneration for the present, and prospect of provision for the future, can be more readily assured. In short, declared the President, "affecting, as it does, the retention or otherwise in this country of the most capable and energetic of the younger professional men, the question of remuneration requires attention, especially when comparison is made with the payment to young workmen of various grades, many of whom do not care to make use of opportunities for improvement, and who at the end of their day's work lay down their tools, and do not trouble further about their work."

CRACKING OIL IN AN ATMOSPHERE OF TAR VAPOUR.

With the intention of cracking the tar along with the oil, and thereby saving oil, it has in the past not been uncommon to mix tar with the oil used in the manufacture of carburetted water gas. Tar has also been used in the generator during a down-run, for the purpose of saving generator fuel. It is, however, stated by Mr. Harold O. Andrew, of the Springfield (Mass.) Gas Company, that most of these attempts met with rather indifferent success, and were discarded. He has therefore attacked the problem from a different standpoint, which he explains in the "American Gas Association Monthly." According to physical chemistry principles, if oil were cracked in an atmosphere containing all the products of the oil reaction with the exception of the end-product (tar), it would be expected that all the oil would go to the formation of tar until equilibrium conditions were satisfied; and *vice versa*, if oil were cracked in an atmosphere of the end-product (tar), it would be expected that all the oil would go to form the other products of the reaction, and none of the oil to tar. Since for equilibrium conditions with a constant pressure there is a definite proportion of the individual constituents for any temperature, he has tried cracking the oil in the presence of at least sufficient tar (about 15 p.ct.) to satisfy equilibrium conditions for the temperature used. The tar was injected into the top of the generator parallel to the fuel-bed during the up-run, in order that it might be vaporized in the generator, and carried into contact with the oil while in the vapour phase, as the intention was not to crack any considerable amount of the tar itself, but merely to supply from an outside source the tar that otherwise would be formed at the expense of the oil. So far the results have been encouraging; and it is believed that a gallon of tar will be made to serve the purpose of a gallon of oil.

Emergency Orders Withdrawn.—The "state of emergency" as contemplated by clause 1 of the Coal (Emergency) Order, 1920, having ceased to exist, the Secretary for Mines gave notice that, as and from Nov. 4, the provisions of the Coal (Emergency) Order, the Lighting, Heating, and Power (Emergency) Order, and the Gas and Coal (Emergency) Order ceased to have effect.

Society of British Gas Industries.—At the autumn general meeeting of the Society—to be held at 2.30 at the Midland Grand Hotel, St. Pancras, on Thursday, the 18th inst., under the presidency of Sir Arthur Duckham, K.C.B.—Mr. Cyril G. Davis, M.Inst.M.E. (the Chairman of the Council), will give an account of the Society's work during the past six months, and will read a paper on the "Changed Conditions of Industry." After the meeting, the members will take tea with Mr. Davis.

Southern Association of Gas Engineers and Managers.—There is a full programme for the annual meeting of the Association, which will take place on Tuesday, Nov. 23, at 2.30, at the Hotel Cecil. After the selection of office-bearers for 1921, the election will be proposed as an honorary member of Mr. S. Y. Shoubridge. Two papers will be submitted—"Some Experiences with the Direct Recovery of Sulphate of Ammonia," by Mr. A. G. Cheal, Assoc. M. Inst. Mech. E., of Crowborough; and "The Manufacture of Neutral Sulphate of Ammonia," by Mr. E. V. Evans, O.B.E., F.I.C., of the South Metropolitan Gas Company. These will be followed by a general discussion on "Calorific Power and Testing of Gas," to be opened by Mr. Evans, who will bring before the meeting a new instrument for rapidly determining the calorific power of coal gas. At the close of the business, afternoon tea will be served.

Messrs. Charles Griffin & Co., Ltd.—Hearty congratulations are extended to Messrs. Charles Griffin & Co., Ltd., the busy technical publishers, of Exeter Street, Strand, whose "good works" are known the world over. These congratulations are offered both upon the fact that the House has reached its centenary, and upon the handsome volume that has been prepared to commemorate so notable an event. Among the firm's numberless literary achievements, this Centenary Volume, with its portrait of the Chairman and Managing Director (Mr. Francis J. Blight) and its foreword by Lord Moulton, will rank by no means last. With such a list of contributors of chapters referring to the technical works published by the firm upon the various subjects with regard to which the writers are experts, it is certain that the book will find a permanent place upon the bookshelf, and that its pages will be perused with pleasure and profit, thereby rewarding the labour that has been incurred in its preparation.

REMOVAL OF SULPHUR FROM GAS BY OIL.

PROPOSALS AT HALIFAX, NOVA SCOTIA.

[A Paper read by Mr. E. R. Hamilton before the Canadian Gas Association.]

The large amount of organic sulphur in the gas produced from Nova Scotian coals has always presented a serious problem to gas manufacture in Halifax. To many consumers, the sulphur in the gas has been so obnoxious that they have discontinued its use. The reputation thus established has badly handicapped the growth of the gas business; and until it can be overcome, gas will never be a popular fuel in the city. The only relief from this trouble has been in carefully venting all appliances. Past records show that the commercial gas, free from all hydrogen sulphide, has contained as high as 120 grains of sulphur per 100 c.ft. Chemical analyses indicate that the high-volatile, good coking coals of the Province that are available in any dependable quantity are high in sulphur; the amount varying from 2·25 to 2·75 p.ct. Analyses are generally lower in volatiles, higher in ash, or do not make a satisfactory coke. American gas coal has been used in small amounts at different times in the past; but present prices and shipping conditions prohibit it. Because of the growing shortage of American bituminous coals, no relief in the sulphur situation can be looked-for from this source.

Use of Lime.

Several methods have been employed for the removal of the organic sulphur. Probably the oldest and best known is the use of lime. The chief difficulty with this process is its disposal after it is foul. It must be either thrown away or reburnt. The offensive odour of the sulphided lime or the sulphur dioxide from burning it is undesirable, especially if the gas plant is located near the centre of the city. Lime purification was used in one of the old Halifax plants; and some of the employees still remember the disagreeable features of the process.

We recently experimented with lime on top of the oxide in one of our purifying-boxes. Careful tests of the sulphur in the gas showed that the method was unpractical, unless we installed additional purifiers for the use of lime alone. The layer of lime which we could employ was limited to about 6 in., as the rest of the space was needed for oxide. The effect was evident only for a few days; a maximum being reached three or four days after turning the box on, and then falling off again in about the same length of time. The greatest reduction was about 33 p.ct., or from 75 to 50 grains per 100 c.ft.

Aniline Oil Suggested.

The use of aniline oil, as proposed by Lomax in 1908, was contemplated; but inquiry into the aniline oil market led us to believe that the system would be expensive to operate, as well as uncertain as to the supply of oil. The method consists of adding aniline oil to a layer of spent oxide in the purifying-boxes. The reaction between the oil and the carbon bisulphide is catalyzed by the free sulphur in the oxide; and while the oxide may be used several times over, there appear to be no means for recovering the oil.

Papst and Hall's Method.

The reheating method used by Papst and Hall in Portland (Ore.), described in 1910, was next considered. Our laboratory experiments showed that we could expect excellent results from it. The chief drawback with the process is the fact that, like a water-gas plant, it requires the attention of a man to operate the generator and to change-over the gas from one reheating chamber to the other. In a small plant, the additional labour and equipment required run up the cost of purification very high.

The Carpenter Catalytic Process.

Carpenter's catalytic process, which has been in successful operation at the Old Kent Road and East Greenwich plants in London since 1913 and 1914, was seriously considered. The temperature required is only 850° Fahr., as compared with 1200° to 1400° Fahr. used in the Hall process; and the method is continuous. With the exception of shutting-down occasionally to burn off the carbon deposited on the catalytic material, there would be no other interruption. To avoid this, a duplicate catalyzer is employed. The process is very economical of heat, as provision is made to transfer the heat in the outgoing gas to the incoming gas.

The chief difficulty which prevented our adopting the system was the cost of the installation and the attention required in caring for the heating system, which would have to be independent of the rest of the gas plant. The patent rights in the process have been offered free to British companies; and while improvements are still being made upon it, its success is well established by seven years of actual operation at the London plants.

The Guillet Process.

The Guillet process, using iron oxide as a catalyzer, has one advantage over the Carpenter process, in that the temperature required is not as high; 400° Fahr. being sufficient to promote the reaction. Steam or hot oil may be used for heating, instead of the direct fire required by the other two systems just mentioned. This process was very seriously considered for Halifax. In fact, plans were drawn-up for the installation. The proposed plant would have consisted of a well-insulated, cylindrical steel catalyzer filled with tiers of pipe-coils, through which hot oil was to be circulated, and also containing two trays filled with iron oxide lightened with non-combustible material such as granulated blast-furnace slag; a heat interchanger for cooling the outgoing gas and transmitting the heat to the incoming gas; and an additional purifying-box. It was proposed to use the Merrill hot-oil system for heating, as it is gas-fired and allows a very accurate regulation of the temperature.

Washing with Paraffin Oil.

This process appeared more nearly self-operative than either of the two other heating methods. The chief difficulty presented was in the amount and expense of the equipment required, the lack of available space, and the delay in getting the necessary material under present conditions. While plans for this last process were being made, we were carrying on laboratory experiments to determine how much the sulphur compounds could be reduced by washing the gas with paraffin oil. The results were rather surprising; for it was found that a reduction of 75 or 80 p.ct. could be obtained, if sufficient oil were used. Kerosene, straw oil (such as is used for toluol and benzole washing), and light lubricating oil were all found to be effective. A series of three small tower-scrubbers were set-up in the laboratory, and the washing carried out on a little larger scale. The results exceeded our expectations, and it became pretty well established that, if the oil could be successfully re-distilled and the process made continuous, this method would prove the quickest and best way out of our sulphur trouble.

We are equipped with a good bye-product plant, which, because of market conditions and the amount of raw material produced, has never so far been used. The dehydrating and dephlegmating column on the tar-still, in conjunction with the still itself, offers a possible means of redistilling the oil; and the storage tanks originally designed for bye-products will furnish storage capacity for the used and fresh oil.

Oil-washing was tried for one day by circulating oil through one of the ammonia tower-scrubbers. A poor distribution of the oil took place, because of the saturated condition of the coke in the scrubber; but sufficient data were obtained to indicate that 50 p.ct. reduction in the sulphur compounds could easily be reached with a reasonably small amount of oil. A steam distillation of the oil in the dephlegmating column of the tar-still demonstrated that the oil could be cleaned-up; and further laboratory tests with the small scrubbers showed no falling-off in its absorption capacity.

The usual gravimetric or Referees' method of testing for sulphur was found to require too much time before the results of any changes in the process could be learned. It became evident early in the work that a shorter control method must be used. The modified Somerville plan proved to be best adapted for our purposes. The products of combustion from a known amount of gas are drawn through iodine solution, and the amount of iodine used-up determined by titration with thiosulphate. Results agreeing within 1 or 2 p.ct. with the gravimetric method can be obtained in a few minutes, as compared with several hours required by the old method.

The proposed installation of washers will be placed immediately after the purifying-boxes. There will be three steel towers, 4 ft. in diameter by 16 ft. high, filled with wooden grids and arranged in series. Fresh oil will enter the last scrubber, and, overflowing from this, will be pumped over and over in the second and first scrubbers successively. For the pumping a battery of motor-driven gear-pumps, each having a capacity of about 600 gallons an hour, will be used. The saturated oil from the first scrubber will overflow to a storage tank located near the still; and when sufficient has been accumulated, it will be steam-distilled at a low temperature to remove the carbon bisulphide, and then pumped to the fresh-oil tank to be re-circulated. Laboratory results indicate that from 0·5 to 1 gallon per 1000 c.ft. of gas will reduce the sulphur over 50 p.ct. With gas containing on an average from 60 to 70 grains per 100 c.ft., this will bring us well within the old Dominion requirements.

A number of difficulties are foreseen. It is probable that there will be some loss of oil in the handling and distilling. As time goes on, the oil may become so saturated with heavier oils from the gas that its absorption capacity will be seriously reduced. This will necessitate a complete redistillation by direct fire so as to leave the heavy products behind. A naphthalene sludge will probably form; but laboratory experiments with filtering have shown that this can be easily removed. Cold weather may make it difficult to pump the oil; but it is expected that by carefully covering the pipes this can be overcome. The absorption of the benzole and toluol from the gas and the resultant reduction in heating value offer another problem; but it is hoped to reduce this to a negligible amount by keeping the wash-oil saturated with benzole and toluol. Otherwise the distillate from the oil will have to be fractionated, and the benzole and the toluol returned to the gas.

Oil-washing of gas is not new. During the war all the large gas plants were urged to undertake it for the recovery of benzole and toluol. But so far as is known, it has not been used primarily for removing carbon bisulphide. If laboratory results are borne-out in practice, the sulphur problem in Halifax will be solved.

To-morrow (Thursday) evening the Midland Junior Gas Association meet to discuss "Ammonia Washing and Scrubbing Plant" and "Points in Gas-Fitting in New Housing Schemes."

SCOTTISH JUNIOR GAS ASSOCIATION.

(WESTERN DISTRICT.)

Opening Meeting.

The Opening Meeting for the session of the Western District of the Scottish Junior Gas Association was held on Saturday evening, the 23rd ult., in the Royal Technical College, Glasgow. Mr. JAMES JAMIESON, of Greenock, occupied the chair; and there was a very large attendance of members.

To a vacancy in the Vice-Presidentship, it was agreed to appoint Mr. James Cubie, of the Glasgow Gas Department. Mr. Cubie expressed his willingness to carry on the joint duties of Secretary and Vice-President for one year.

Mr. JAMIESON thereafter delivered the following

PRESIDENTIAL ADDRESS.

From actual experience I am strongly of opinion that the use of low-grade gas is highly beneficial; and whether 450 or 400 B.Th.U. gas is supplied matters little, provided its composition is constant and the pressure arrangements adequate. The gas-consuming public are quickly accustoming themselves to the changed and changing conditions; and where gas engineers have taken time by the forelock, and adjusted all the gas-burning appliances on the district, complaints are now fewer than in pre-war days. This, I am pleased to say, has been accomplished in Greenock; and we are ready at any moment to supply gas of 400 B.Th.U. quality or lower, as circumstances demand. Gas of this quality has been distributed in Greenock with excellent results, and with no increase in the normal complaint list.

In addition to a Boys and a total-heat calorimeter, one of Simmance-Abady's self-recording calorimeters (the instrument experimented with by Sir George Beilby) has been in daily use in Greenock for six months, with satisfactory results. The instrument, compared with the ordinary calorimeter, is practically correct: but greater recording accuracy would be attained with a chart of more open section. I put no reliance, however, in self-recording calorimeters unless they are checked and adjusted daily against the ordinary standard instrument. Testing gas for its calorific value is a comparatively simple operation; but unless great care is exercised by the operator, and the instrument and thermometers are kept up to standard, the results are anything but reliable.

Some time ago, we had occasion to experiment with incandescent lighting, using high and low grade gas, and found that low-grade gas gave the better results. Our experience teaches us that medium-sized mantles must be used, if the consumption is to be kept down and the best results obtained. Unfortunately, burner makers are not looking ahead; for after five years of low-grade gas it is impossible to obtain suitable nozzles and mantles to refit existing inverted burners. The new "Podmore" burner, which is supplied with universal, medium, and bijou nozzles and mantles, gives most excellent results; but a great improvement would result if the primary air openings of this burner were made so that they could be completely closed if necessary. It is important that the air supply to all atmospheric burners should be under absolute control.

The lighting of common stairs, landings, and passages in Greenock is carried out by the Corporation, and much dissatisfaction exists regarding it. Only 1 c.ft. of gas per burner per hour is allowed; and naturally this small quantity is quite inadequate to light an open stair or landing when rat-tail or flat-flame burners are in use. The Corporation have recently put their parliamentary powers into operation, and landlords are now obliged to use incandescent burners; but there was not a burner on the market capable of giving a satisfactory light with 1 c.ft. of low-grade gas, until we went into the matter and had a burner and mantle made to our specification.

From actual experience with low-grade gas we have learned that what is wanted is volume. This extra quantity of gas has to be delivered through the existing mains, and only by increased pressure can it be accomplished. To give an adequate supply in our town we have arranged our area in districts, and admit high-pressure gas into each low-pressure district through suitable regulators. This provides the necessary energy, and compensates for any increased demand. At present 25 p.ct. of our maximum load is delivered in this manner at a cost of 0·49d. per 1000 c.ft. for compressing by gas-driven compressors; and arrangements are being carried out whereby 50 p.ct. of the load may be delivered under compression. Daily pressure charts are taken from each district, and irregularities are immediately remedied. During one week each year (the period of maximum consumption) pressures are taken at every alternate street-lamp and recorded—thus enabling us to compare year by year the pressure at similar points of our distributory system. We have tackled the pressure arrangements of our town as if our very existence depended upon it, realizing that upon this point depended the success of the introduction of low-grade gas. It is pleasing to record that we have been able to secure the lighting with low-grade gas of all the new streets at present being formed in Greenock.

RIVET HEATING BY GAS.

Greenock being an engineering and shipbuilding town, we have given our attention to the use of gas for industrial purposes. To capture this business, a start was made by introducing a thoughtful and energetic publicity campaign. On this item our expenditure last year amounted to £262, which is equivalent to 0·17d. per 1000 c.ft. of gas made. For the past two years we have continuously fed our local industries with pamphlets and articles relating to gaseous firing, and have supplied the Press with accurate information. We believe the engineering and shipbuilding industries are now keenly alive to the possibilities of town gas as an aid to fuel economy. Our efforts have principally been directed to large plate and angle furnaces, portable rivet-heaters, large core-drying ovens, metal melting, and pipe-bending stoves.

Our efforts with large plate and angle furnaces have so far been only partially successful, principally owing to inability to show at work a furnace large enough to deal with plates and angles. Ground space being limited in a shipbuilding yard, a new furnace must replace the one at present in use. It is only natural, therefore, that firms interested in the process are somewhat reluctant to become pioneers, as failure would disorganize the work of the entire yard. We are satisfied, however, that the work of plate and angle heating can be performed much cheaper with gas than with any other fuel; and being convinced of this, we have made an offer to a large and influential firm which only involves them in the supply of a convenient site and the expense of unskilled labour for building the furnace. We are prepared to supply all material and skilled labour, in order to demonstrate the efficiency of town-gas firing for this class of work. Of course, if the furnace is a success it will be taken over at full cost of erection, &c. We are quite prepared to give gas for the purpose at 2s. 4d. per 1000 c.ft.

The rivet-heaters at present in use are for solid and liquid fuels. This business should be easily captured, as the Americans during the war and since have used gas most extensively for this class of work. Up till now our principal trouble has been in securing a suitable portable furnace for shipbuilding work. The Davis Furnace Company, in collaboration with ourselves, have now produced a heater which, I am sure, will soon be adopted in most shipbuilding yards. From an economic point of view, solid and liquid fuels cannot compete against it. A test of this rivet-heater gave the following results:

Rivets used were mixed, ranging from 2¾ in. long by ¾ in. to 6 in. by ¾ in., and weighed 205 lbs. for 311 rivets.

Starting from Cold.		Consumption.		Weight.
11.0	..	—	..	—
11.5	..	(1st rivet out)	..	—
11.30	..	165 c.ft.	..	72 lbs.
12.0	..	135 ,,	..	92 ,,
12.30	..	205 ,,	..	145 ,,
1.0	..	185 ,,	..	131 ,,
1.30	..	175 ,,	..	128 ,,
2.0	..	160 ,,	..	130 ,,
3.0	..	300 ,,	..	259 ,,
		1325 c.ft.		957 lbs.

Total gas used, 1325 c.ft.; time, 4 hrs.; weight, 957 lbs.
= 1·384 c.ft. per lb.

An interesting point is that No. 1 rivet came out in five minutes from lighting-up; and one hour from starting 92 lbs. had been withdrawn.

This is a very substantial saving on fuel cost alone. Other advantages are: At present thousands of pounds are spent annually in removing the *débris* thrown into ships' hulls by the riveters. With gas, this can all be saved. One boy will be able to attend at least two rivet squads, as compared with two boys for one squad, as at present. Less rivets will be lost and burnt, and no time lost clearing forges. No oxidation of rivets if the furnace is properly adjusted; and, lastly, speed and efficiency are promoted. The furnace will be used on high-pressure air and low-pressure gas. It is proposed to run services to convenient points on ships under construction; and the gas and air connections will be made by armoured hose.

CORE-DRYING OVENS.

Gas is an ideal fuel for this class of work; and very few foundries where a supply of gas is available are without a small core-drying oven for light work. The large ovens, however, are still fired with solid fuel. The ovens in principal use are built of firebrick, with an external producer. Coal or coke is burned, with a large excess of air. The hot gases are drawn by chimney draught through the oven, and carry off the moisture from the cores. As many small ovens were doing this class of work in our district, we decided the time was opportune to experiment in the matter on a large scale. We consequently put forward a proposal to a firm contemplating the building of new ovens; and the firm agreed with the utmost alacrity. The dimensions of the oven are 8 ft. by 16 ft. by 22 ft. long. As originally constructed, it was similar to a japanning stove. The oven when completed and tuned-up dried the heavy cores successfully, and at less cost than in the old solid fuel fired oven. The consumption of gas in this core-drying oven averages 18,000 c.ft. per day of 24 hours, or 750 c.ft. per hour, with an increased output of from 5 to 7 tons of cores. With gas at our price, this is cheaper than solid fuel; but we are convinced a further saving can be effected, and are at present experimenting with a specially designed high-pressure arrangement, in which a large volume of air will be gas heated and circulated within the oven, also utilizing the heat of waste products. With this arrangement we are hopeful of converting all solid fuel core-ovens to gas heating. A further saving can be effected by improving the insulation, which is not quite perfect in this oven.

A few of the benefits which the foundry people say they are deriving from this oven are: (1) No fuel to be carted or stored, and no labour attending producers. (2) Heat distributed uniformly throughout the oven. Work can be carried out much more speedily without fear of cracking the cores. (3) Since the adoption of gas, not a single casting has been spoiled by a damp core. (4) Cleanliness. The cores after drying require no cleaning whatever, and have a beautiful smooth skin. With solid fuel, a skin of carbon or dust adheres to the core, and if not removed causes trouble with castings. The conditions within the foundry are much healthier, on account of the absence of smoke and dirt. As this business is largely a night load, no effort should be spared to capture it.

SUPPLY OF FUEL GAS.

The Low-Temperature Carbonization Company are very keen to gain a footing in Scotland, and have been to some trouble to make it known that they have in hand a large scheme within the Clyde area. The Company have tried hard to get Greenock manufacturers to take up their patents, and erect a large plant in order to obtain cheap fuel gas. I believe gas was offered for this purpose at a price sufficiently low to show a saving of 5s. per ton of coal used—an obviously unremunerative price. In my humble opinion, the results outlined in their prospectus are not realizable from average Scotch coal.

While on this subject it might be interesting to remind you that, owing to the foresight of the local authority and their past advisers, we, as gas suppliers, have, under our 1909 Order, power to supply non-luminous or fuel gas as well as illuminating gas any time we choose; and it is unlikely that the Town Council will relinquish their powers to any other company. This was a wise precaution; and people framing Parliamentary Orders at the present time would be well advised to make provision for the competition which is sure to arise in industrial centres.

As gas for industrial purposes will only be universally adopted when we can deliver the gas at the point of combustion at a sufficiently low price to undercut all other fuels, it is important that we should closely study and examine all known methods of production. Much, of course, depends on the quality of the coal we are to receive in the future. Coal being a national asset, legislation ought to be introduced to enforce the grading of quality in order that each particular type of plant may have material best suited for economical working. At the present time coal is being sold containing as high as 25 p.ct. of ash, against 8 p.ct. in pre-war days. Our average ash content for the past three months was 20 p.ct.; and as our vertical retort plant was erected to produce 2,000,000 c.ft. per day on the basis of 8 p.ct. ash content, it is a very serious matter indeed, and militates against economical gas production. Our consumption of coal is at present 38,000 tons per annum; and on this quantity the increased ash content is responsible for an estimated loss of £9863, or 4·06d. per 1000 c.ft. of gas made.

The inert material in coal is a matter which demands the immediate attention of the authorities. The Government have considered it wise to promote legislation protecting the consumer of gas, but is it not equally incumbent upon the Government to protect the producer of gas as well? Upon the quality of the raw material supplied for carbonizing depends the quality, quantity, and the cost not only of gas, but of many other manufactures.

VERTICAL RETORTS AND WATER GAS.

After urging that the time has come when all coal should be sold on a B.Th.U. basis, the President said that the results obtained by the Investigation Committee at Uddingston have put beyond any doubt the efficiency of vertical retorts and water gas for the manufacture of low-grade gas. One coal was used throughout; and while of poor quality its constancy of composition is worthy of notice. The physical properties of the coal have an important bearing on the results obtained. Doubles and trebles make an ideal fuel—the speed of carbonization being much greater than with screened or unscreened coal. Where steaming is practised, the matter is of more importance. The speed of carbonization to a great extent determines the depth of the uncarbonized coal, and therefore the quantity and temperature of the coke suitable for the production of water gas. The quality of coke, whether dense or friable, determines the quantity of steam necessary. It is desirable, therefore, to work with as few coals as possible, because, the behaviour of the plant under steaming conditions once noted, the plant can be adjusted and run with a minimum of trouble. Large works are handicapped in this respect. Our supplies are received from 29 collieries, varying from cannel to fairly good coking coal; the proportion of nuts to large coal being 30 p.ct. Circumstances, unhappily, compel us to carbonize in our eight ovens fifteen coals mixed and possessing different characteristics. Analyses have been made, and the peculiarities of each coal noted, in an endeavour to obtain suitable mixtures for steaming; but the great irregularity of supplies makes good working a hopeless task. The feed to each retort has to be carefully regulated according to the nature of the coal, and more often than not this is a matter of guesswork. On examination, one is impressed by the variation in the quality of coke from day to day. Samples of gas drawn from two retorts where pyrometer readings were practically identical, and the steam pressure constant, showed a variation of 3 p.ct. of CO_2. Conditions being similar, it is obvious that the variation and difference are due to the coal.

STEAM REGULATION AND RETORT HEATING.

Under steaming conditions, each vertical retort becomes a water-gas producer, and the chances of increased CO_2 content multiply with the number of retorts in use. Where the quality of coal is changing, it is desirable that the steam supply to each oven, and preferably to each retort, should be controlled by a positive kind of reducing valve. I would recommend this in the interest of efficiency; otherwise fuel will be lost in producing CO_2, in maintaining the retort temperatures, and in the generation of steam; the work of the condensers will be increased owing to the large volume of steam escaping undecomposed; and there will be produced an unnecessary quantity of weak ammoniacal liquor. In the interest of constant composition, it becomes necessary to devise means of having the absolute control of the volume and the temperature of the steam entering the retorts from hour to hour.

The system of retort heating is important; and I am inclined to favour a method which gives flexibility. If steaming is to be practised successfully, then a very high bottom temperature is necessary; but if good quality straight coal gas is sought after, then high top heating is to be recommended. Wherever verticals are at work, steaming is now very much in favour. For the production of good water gas high temperature is necessary.

Heat can be added in two ways—by applying it externally at the zone of water-gas production, or by the internal use of steam very highly superheated. Applying external heat to a retort is probably not the most efficient method; but I am afraid for this purpose it is at present the only practicable and profitable one. If steam could be superheated by the waste gases to the high degree desirable, carbonization could be partly brought about by internal heating. Such a scheme would be ideal and highly efficient, and has everything to recommend it.

Unfortunately, it is a very difficult thing to heat steam to a temperature sufficiently high to be of much service to us. Waste in the setting would be encouraged in trying to maintain the high degree of superheat necessary. This brings us to the independent superheater, with all losses attendant upon the combustion of further quantities of fuel and extra labour. From actual experience, I consider that the cost of superheating in a separately-fired superheater makes it prohibitive. Moreover, the destructive properties of highly superheated steam on pipes, valve-faces, &c., are well known; and special metal has to be introduced where it is used. Brickwork, I am afraid, would not stand-up to the constant use of very highly superheated steam. The advantages to be gained from the use of superheated steam are: Less loss of steam due to condensation; less heat lost in the water-gas reaction, as the hot, dry steam is nearer the point of decomposition; increased gas production; better coke; and temperature of retorts more easily controlled.

THE IMPROVED "K. AND A." WATER-GAS SYSTEM.

As the process of water-gas production within vertical retorts is highly scientific, I would plead for greater care in steaming, and for modesty on the part of those who attribute fancy makes per ton to steaming without reference to the analysis of their gas. While realizing that no more profitable method of water-gas production can be applied in a small works where conditions allow, I am of opinion that the extra attention necessary on a large plant using a number of coals, together with the amount of hazard entailed—especially if constant composition is to be maintained—makes the production of water gas in vertical retorts a very doubtful proposition.

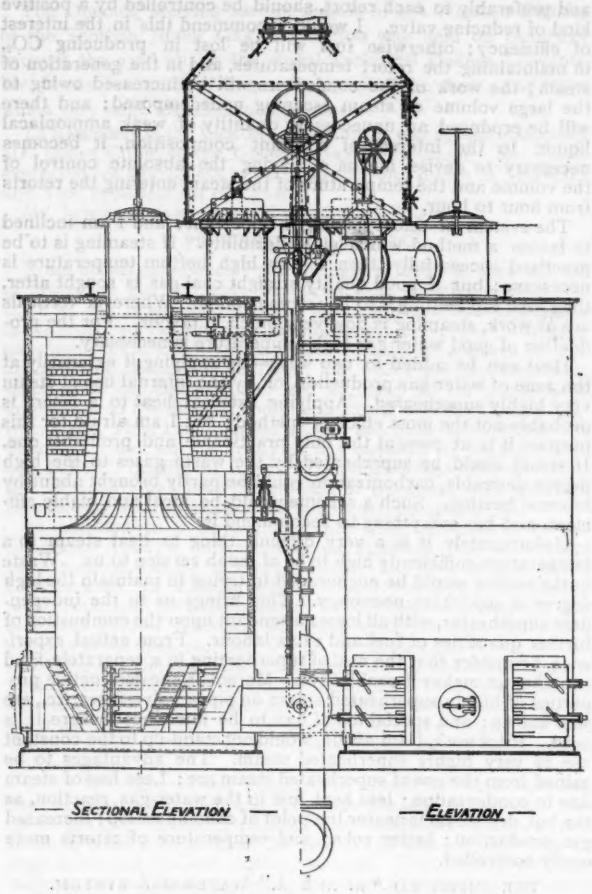
We have turned our attention to the production of water gas in separate producers, and intend admitting water gas to our verticals either alone or with a little steam, in the hope that we may be able to derive the maximum benefit in therm production. We intend ultimately aiming at a water gas with as high a hydrogen content as possible, so that we may take advantage of the high diffusive power of this gas for sweeping-out the volatile matter remaining in the coke.

The plant is of the improved "K. & A." system, as constructed by Messrs. Perry & Co., and has a capacity of 750,000 c.ft. per day. It consists of a double generator, each having a charging retort surmounted by regenerators of checker brickwork. The generators are quickly blown-up in parallel; the blast products, on their way to the stack-valves, passing up through checker brickwork. Any CO formed is burned by the secondary air. The waste gases thus heat-up the fuel in the retort, so that it is fairly high in temperature by the time it enters the generator proper. On the run steam is admitted at the top of one generator, passes down through the checker-work where it is superheated, enters the first fuel bed, whence it passes into the bottom of the second, and up through, finally escaping at the charging retort. The process is reversed every alternate run.

As will be noted, this combines a shallow bed for the blast and a deep fuel bed for the run. In the ordinary combustion of coke in a heavy fuel bed, the oxygen is first converted into CO_2, and in its further travel is reduced to CO. The object of the shallow bed is that, by using large coke and a stronger air-blast, practically no CO will be found in the products, and a greater amount of heat will be stored-up in the generators—thus shortening the blow and adding to the period of gas making. This takes advantage of the fact that when carbon is burned to carbonic oxide only 4000 B.Th.U. are liberated, but when consumed to carbonic acid 14,500 B.Th.U. are liberated.

With a plant of this description, if full advantage is to be taken

of the shallow fuel bed, only the best of screened coke can be used. At first it was feared that, with the superheating of the steam and the high blast temperature, clinker trouble would be severe. This has been the case; but arrangements have been made whereby some saturated steam is admitted at the bottom of each generator. It should be noted that the gas, prior to leaving the last generator, meets with a high temperature, thus assuring thorough reduction and a low carbonic acid content.



Modified "K. & A." Water-Gas Plant at the Greenock Gas-Works.

TOTAL GASIFICATION EXPERIMENTS.

Our plant is not designed for the total destruction of coal; but experiments have been made in this direction, with interesting results. From the design of the plant, it will be noted that external heating of the entering fuel and its ultimate gasification by highly superheated gas is taken advantage of. Previous to going on coal, the plant is run for a few hours on coke, until a red heat is visible on the retort. Coal is then fed slowly into each retort, and the plant run as usual. The character of the water gas changes immediately after the first run on coal. On account of the short blow, it was thought that the coal gas generated during this period could be compressed into the top portion of the retorts, and would be swept out of at least one retort immediately the plant was put on gas making. Unfortunately, the gas generated during this period exerts greater pressure than the blast, and forces its way down into the generator, where it is lost in the blast products. To prevent this loss, arrangements are being made to take the coal gas off during the blow. It should be noted that only one retort produces coal gas at a time. The coal gas that is generated in the other retort has to force its way down through the fuel bed, where it is split-up into carbon and hydrogen. This undoubtedly reduces the calorific value of the gas produced.

These two losses, though trivial, bring down the efficiency of the process; but we are hopeful both can be overcome. No difficulty has been experienced with the fuel bed hanging-up. The heat in the generator is more easily maintained, and the duration of the blow can be shortened—resulting in a saving of fuel. Sufficient heat is carried away in the blast products to raise steam for this plant and give some surplus.

I append here the result of a trial run in coal and coke. The same labour would be sufficient for a plant of double capacity, which would bring down the cost per therm considerably.

Unfortunately, the retort section of our generator is only 8 ft. long. It was hoped that the very high temperature at which the water gas permeates the charge would have been sufficient to carbonize the coal completely before reaching the generator; but in our plant this can only be accomplished by sacrificing gas-making capacity, by allowing more time in changing-over from blow to run. An examination of the blast products reveals an increase in the CO content when running on coal. Undoubtedly, a longer retort would give better all-round results. Only approximate results have been obtained for tar and ammonia; and I would rather not mention them at present. The coal used was Shotts washed trebles, and was specially selected. Whether or not these results could be maintained over a period is a matter which is at present being investigated. Good results from coke have been maintained over a period of six months.

Trial Runs—Duration Eight Hours.

—	Coal.	Coke.
Gas made (corrected)	211,300	240,000
Coal and coke used	4—5	4—10
Gas made per ton (corrected)	50,200	53,555
Calorific value (calculated)	345 B.Th.U.	308 B.Th.U.
Average ash content	12 p.c.	20 p.c.
Cost per therm	4·179d.	5·292d.

—	Average Analysis of Mixed Gas.	Average Analysis of Water Gas.
CO_2	4·8	2·50
O_2	0·2	..
Illuminants	0·7	..
CO	31·3	45·50
CH_4	6·5	1·95
H	50·7	45·92
N	5·8	4·13
Total	100·00	100·00
Total inerts	10·8 p.c.	6·63 p.c.

At present we are running continuously on a mixture of 33 p.ct. coal and 67 p.ct. coke, producing, after allowing for fuel returned to the boilers, an average of 57,000 c.ft. of 325 B.Th.U. gas per ton. With this arrangement, all previously mentioned losses have been overcome, and little or no tar produced.

A process like this offers a ready method of producing low-grade gas conforming with the new Board of Trade regulations. The calorific value is low; but the smaller quantity of air necessary for its consumption gives it a high calorific value at the burner-head. Perhaps those who have erected special plant for the treatment of coal in this way will give us the benefit of their experience.

MAINTENANCE OF VERTICAL RETORTS.

Our vertical installation is of the Woodall-Duckham 1913 design, and consists of eight ovens each of four 5-ton retorts, capable of producing 2 million c.ft. of gas per day with first-class coal. It was brought into operation in December, 1914. The plant is in full work during the winter months; four or five ovens being sufficient in the summer. Ovens were let-down every alternate summer, and the retorts pointed and washed with fire cement. This practice was considered wise at the time; but I am now firmly convinced it was wrong, if the longest life was to be secured from the retorts—nothing being so destructive on an installation of vertical retorts as lighting-up and letting-down. After four year's intermittent work, three retorts showed signs of wear; the sides beginning to bulge inwards. These retorts would probably have worked another twelve months without giving serious trouble; but as they would not be off again for two years, it was decided to rebuild for a length of 10 ft. The panel-bricks of which the retorts are built showed no signs of wear, due no doubt to the average working life of the retorts being only about 1026 days.

Last summer we rebuilt nine retorts, and this summer seven retorts; the average working days being 1285 and 1653 days respectively. This makes a total of nineteen retorts rebuilt. Of the remaining thirteen retorts, having an average of 1640 working days, eight are in good condition, and the other five, while showing slight bulging, are expected to run till next summer—thus being in use for an average of over 2000 days. The panel-bricks of the retorts rebuilt this year showed considerable wear; and I consider, in the interests of efficiency, it will pay to rebuild after 1800 working days. With one class coal, the life of the retorts would be lengthened. We have on no occasion gone further down than 10 ft. The bottom part of the retorts are in splendid condition, and will run for many years.

Each producer has been re-lined once; but no repairs have been necessary on the regenerators. I am of opinion that regeneration is overdone, and extensive regenerators not only increase the first cost of the settings, but are liable to give much trouble owing to short-circuiting.

The design of the Woodall-Duckham settings has been altered around the combustion chambers since first they were erected in Greenock; and all our repairs are being carried out on the new plan—the retort being reduced 1 in. in width to facilitate speedier carbonization. I am convinced that future repairs owing to bulging will be *nil*, and only the wear of the fire-brick will make rebuilding necessary.

The ironwork of the coke-discharge door has given a lot of trouble, due entirely to the wear of the cast-iron parts.

Bottom Casting.—This is the main casting, and carries all fittings in connection with the water-sealed discharge door. The tongue, which was originally $\frac{7}{8}$ in. thick, has been worn away,

allowing coke and breeze to pass, and causing trouble with the door. Elsewhere no serious wear is evident. To renew this casting is a difficult and an expensive job. We have been able to avoid putting-in expensive new castings by fitting cast-iron wearing strips which can be renewed at any time.

Curved Discharge Door.—The $\frac{7}{8}$-in. metal of which these were constructed has been worn through. New plates have been fitted on each retort. The average working life of these curved plates has been 1500 days, though several have had a much shorter working life. Dates on which new plates were fitted have been recorded; and to prevent a number of the curved plates giving way at the one time, it is our intention to renew at different periods. We have tried castings of mild steel; but I fancy their "life" will be no longer than cast iron.

Small Hopper Plates.—These have been in some cases worn to $\frac{1}{4}$ in. thick; original thickness $\frac{7}{8}$ in.

Top Mouthpiece.—This has been worn through in some cases.

All the larger and more expensive castings have been bored and gauged, but little or no wear is evident. The destructive nature of coke and breeze on castings is well known; and these bottom castings should be designed so as to facilitate speedy removal for renewals. Greater advantage should be taken of "wearing" plates.

The makers of vertical retorts must see to it that the mouthpiece and gas off-take fittings are absolutely air-tight under ordinary working conditions. This is a fault in early designs; and now that inerts are limited, greater attention must be given to this matter.

No money has been spared in keeping our plant in good condition. I append the cost of maintenance and repairs:

Coal carbonized . . . . . 229,378 tons

Repairs to Brickwork.

—	1918.	1919.	1920.
Number of retorts rebuilt .	3	9	7
Material	£53 13 1	£158 1 2	£327 18 11
Bricklayers	52 8 11	371 6 2	419 4 2
Labourers	50 3 6	241 8 4	246 12 7
Total	£156 5 6	£770 15 8	£1093 15 8
Cost per retort	£52 1 10	£85 12 10	£156 5 1

Repairs to producers £300

This includes the elevating and handling of all building material. The increased cost per retort rebuilt each year should be carefully noted:

Cost of ironwork, casting, &c., including fitting . . £664 14 11
Total cost of repairs to date £2985 11 9
Cost per ton of coal carbonized . . . . . 3·13d.

I have tried to avoid introducing theory in my address. My endeavour has been to treat my subject practically. There may be nothing in it not already known to most of you; but I have at least put before you matter which is of vital importance to our industry.

In the discussion that followed, reference was made to the varying methods of lighting common stairs, landings, and passages in the various burghs and county areas throughout Scotland. The discussion brought out no point of outstanding interest, though it was informative in regard to the prevailing practice.

ECONOMICAL BURNING OF BLAST-FURNACE GAS.

The Weyman System.

In a preliminary leaflet, Mr. J. E. Weyman, of Pilgrim House, Newcastle-on-Tyne, describes his new system for the economical burning of blast-furnace gas and other gas, when the gas pressure, and consequently the volume, varies. This regulates the air in proportion to the gas, and by so doing enables the bunsen type of burner to be used, in which the air and gas are properly mixed, and combustion is effected at the nozzle of the burner in the furnace—thus giving the highest flame-temperature at the right place, and avoiding the slow burning of the gas partly in the furnace and partly in the flues and chimney. The system has been in use with dirty blast-furnace gas over a long period; and comparative evaporation and efficiency tests of two water-tube boilers, at the same time and under exactly similar conditions, one fitted with "Weyman" automatic air regulation and patent bunsen type burner and the other with a good example of an ordinary type burner with hand adjustable air supply, showed a gain in actual evaporation of 33·23 p.ct. in favour of the first-named boiler. The heat efficiency was, from careful calculation, practically 70 p.ct. Mr. Weyman points out that, taking a water-tube boiler evaporating 10,000 lbs. of water per hour, the saving effected in accordance with this trial would be equivalent to over 1200 tons of good coal per year of 300 days of 24 hours.

There is a patent governor or regulator of the bell type, having a central tube in the bell, which as the bell rises, carries up by suction a weight of water approximately equal to the pressure on the area of the cross section of the bell, less the pressure required for the mechanism—thus ensuring a steady up-and-down movement. The regulator is suitably connected to grids or shutters covering the air-ports in a special gas-burner. As the pressure in the gas-main varies, the regulator, responding more or less, opens the grids or shutters for admitting air to mix with the gas in the burner. The mechanism affords a means of adjusting the right quantity of air for gases of different calorific value. Dirty gas, it is said, does not interfere with the working of the regulator at any time, and the burner need only be cleaned at the same time and in the same manner as boiler tubes. A single regulator will control the burners for two or three boilers.

GAS UNDERTAKINGS AND ACCIDENT PREVENTION.

It is the practice of the Malden and Melrose (Mass.) Gas Company to set aside "Accident Prevention" and "First Aid" days, at which time all employees of the Company are brought together for the purpose of receiving instructions on how to avoid accidents, and how to render first aid when they occur. Taking a special branch of work, Mr. R. S. Carter, the Company's Superintendent, points out that accidents when laying gas-mains, which may result in injury to members of the public, as well as to employees, may be largely prevented by consistent and systematic instruction. It has been estimated that from 30 to 50 p.ct. of industrial accidents can be prevented; and the greatest preventive is carefulness. Certain industries, however, include operations from which danger can never be entirely eliminated; and Mr. Carter thinks the work of laying gas-mains falls within this class. Gas poisoning is one of the greatest of the hazards; and to guard against this, the Company provide respirators which can be worn with comfort when men are obliged to work in the presence of gas. A life-belt should also be buckled round the waist, with a man outside the trench holding the rope. When connecting service-pipes with mains, all threaded fittings should be examined before being used, so as to determine the condition of the threads. Defective tools contribute liberally to painful and serious accidents. A cold iron chisel when cutting cast-iron pipe, if badly mushroomed on the striking head is very dangerous, not only to those using the chisel, but to persons near. The possibility of the handle breaking, permitting the chisel to fly and do injury, is made even worse by the presence of the mushroomed head. It is from tools of this kind that pieces of steel break off, causing serious eye injuries. When men are cutting pipe by means of striking hammers and cold iron chisels, the Company provide goggles. Until recent years, in striving to put through work at low cost, the avoidance of accidents has been overlooked as one of the big factors in reducing the cost. This applies to laying gas-mains, just the same as it does when manufacturing staple articles. Accidents to employees in all departments are costly to the employer.

IMPROVED CONTROL OF DISTILLATION.

Mr. Thomas W. Pritchard, of the Fuel Products Corporation, New York, expresses the belief that their research work has opened the door to the solution of some problems by providing a process whereby destructive distillation may be carried on under definite control. One of these problems is in connection with the regulation of temperature, and another the removal of the vapours of distillation from the chamber. In the process described, the material to be distilled is placed in a closed retort, which may be either vertical or horizontal, depending upon the class of material to be dealt with. Then the retort is sealed, and heat is supplied to the outside walls. An outlet pipe from either the top or the bottom of the retort leads to a condenser; and at this point the new method comes in. From the condenser such vapours as are not condensable are carried to a closed blower or fan; and from there they are forced through a superheater and returned to the retort, passing through the distilling mass. By means of their positive carrying power and sweeping effect, they not only distribute the heat units through the mass, but act as a scavenger, and carry out the vapours formed as rapidly as is desired. The rate of flow of the gases through the retort serves as a direct means of temperature control, without regard to the heat applied to the outside walls of the retort. The cycle of circulation is kept up until by the temperatures and flow of distillates, it is known that the operation is completed. Thus, it is claimed, there is a definite temperature control during the entire operation; while the time of distillation has been reduced at least one-third. The quantity of distillates has been in every case increased—in some instances sufficiently to pay for the entire operation. Further, the quality of the distillates is improved; and they are uniform, and can be produced of a definite standard. In all cases they are much more easily refined, and the refining losses are less. By means of temperature control, some unusual facts have been developed. A temperature variation of 60° C. increased the production of toluol from 0·88 gallon to 1·93 gallons per ton, and changed the amount of solvent naphtha from about 4½ gallons to, approximately, 35 gallons per ton. Many materials which seem to expand in spongy masses under ordinary distillation are perfectly tractable by this method. A commercial plant of a daily capacity of 20 tons has just started on the manufacture of bone charcoal.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Gas Companies' Protection Association.

SIR,—It may be convenient if, for once, I take upon myself a duty of the Secretary, and reply to your inquiry by stating that Mr. Harry Jones has resigned the chairmanship of this Association, but (with Mr. Charles Hunt) continues a Vice-President, and also remains a member of the Committee. At the meeting of the Committee held last Thursday week, Mr. R. W. Edwards and myself were elected Vice-Chairman and Chairman respectively of the Association.

Perhaps you will allow me to add a little personal explanation. That I might be elected to the chairmanship, upon his retirement, was an honour which Mr. Jones had long expressed the hope might be accorded to me. Indeed, his desire has been the subject of several written and personal requests by him that I would accept such a nomination. My only hesitation in this matter arose from my uncertainty as to how far acceptance would be consistent with medical orders to shed unnecessary responsibilities. Time alone will provide an answer to this.

But I have no doubt whatever as to the *rôle* the Gas Companies' Protection Association should play—not only watchfully, but constructively—in safeguarding the interests of that special body of investors who are holders in the stocks and shares of gas companies. I am certain that all the sophistry in the world will not convince these people that their interests are identical with those of the ratepaying owners of municipal gas undertakings.

The Association has behind it a long record of valuable service to the industry, and that, too, on a far-reaching scale, as Mr. Jones has reminded us in referring to the Standard Burner Acts.

My hope is that gas companies will in the future be conducted more and more as commercial organizations, and less and less as the "monopolies" they once were. Certain regulations there, of course, must be—such as those under which the butcher and the baker and other purveyors of necessaries carry on their businesses. But otherwise, freedom to trade in the broadest sense of the word, unhampered either by unfair bureaucratic control, unfair municipal competition, or throttling of business by rings and trusts, must be secured.

For these and many other reasons I earnestly beg the support of gas companies for their only Protection Association.

CHARLES CARPENTER.

South Metropolitan Gas Company,
Nov. 9, 1920.

REGISTER OF PATENTS.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official List" for Nov. 3.]

Nos. 30,064 to 30,756.

AYMARD, M. F. L. A.—"Manufacture of gas from carbonaceous fuels." No. 30,435.

BELL, W. G.—"Cock for liquids or gases." No. 30,674.

BENNIK, H.—"Regulating-devices for gas-burners." No. 30,447.

BLACK, J. S.—"Retorts for distillation of oil-bearing shales, &c." No. 30,724.

BROUGHTON, H. F.—"Apparatus for separating and screening coke, coal, &c." No. 30,069.

BOYNTON, V. K.—"Process of producing interactions between gas and a liquid." No. 30,354.

BROWNJOHN, F. W.—"Combination gas light and heater." No. 30,580.

DOHERTY, H. L.—"Closing-devices for gas-generating furnaces, &c." No. 30,157.

DOOTSON, F. W.—"Production of light oils, lubricating oils, and gas by cracking pitch and heavy oils." No. 30,127.

DUCKHAM AND JONES, WOODALL.—See Woodall. No. 30,653.

EICKWORTH, R.—"Gas burners." Nos. 30,526-27.

EYRE, E.—"Gas, &c., fittings." No. 30,740.

GASKIN, R. W. E.—"Dry gas-meters." Nos. 30,129 30.

GRILLETTE, L.—"Gas and vapour heating burners for steam-generators, &c." No. 30,342.

HARRISON, W.—See Eyre, E. No. 30,740.

HILGENDORFF, A.—"Apparatus for utilization of the heat of outlet gases." No. 30,291.

JONES, WOODALL, DUCKHAM, AND —See Woodall. No. 30,653.

KEITH, G. & J.—"Gas burners." No. 30,321.

KLÄRDING, N.—"Purification of blast-furnace and generator gases." No. 30,525.

KOUSNETZOFF, N.—See Hilgendorff, A. No. 30,291.

LEWIS, G. P.—"Protective progressive distillation and gasification of solid carbonaceous matters." No. 30,537.

LOCKETT, W. T.—"Manufacture of combustible materials from coals, peats, &c., and sewage and trade waste sludges." No. 30,471.

M'CLELAND, N. P. K. J. O.—See Dootson, F. W. No. 30,127.

MACLACHLAN, A.—"Deodorizing gases." No. 30,661.

MELVILLE, J. P. M.—"Means for coupling pipes, tubes, &c." No. 30,166.

SINNATT, F. S.—See Lockett, W. T. No. 30,471.

SMITH, E. W.—See Gaskin, R. W. E. Nos. 30,129-30.

SMITH, J.—"Coal-gas exhausters." No. 30,175.

SMITH METERS LTD.—See Gaskin, R. W. E. Nos. 30,129-30.

SUTTON, C. J.—"Burners for incandescent gas lighting." No. 30,345.

WILSON, J. L.—"Distillation of tar." No. 30,696.

WOODALL, DUCKHAM, & JONES.—"Tunnel kilns." No. 30,653.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF COMMONS.

Public Utility Companies (Capital Issues) Act.

Copies were presented of reports on applications to the Board of Trade under the Public Utility Companies (Capital Issues) Act, by the Croydon Gas Company, Farnworth and Kearsley Gas Company, Burnham Gas Company, and Oxford Gas Light and Coke Company.

Protection of Dyestuffs and Other Key Industries.

Sir ROBERT HORNE (the President of the Board of Trade), replying to questions by Mr. Evelyn Cecil, said he was aware that the imports of dyestuffs and intermediates into this country had increased very substantially during the last few months, and that a large proportion of these imports had been from Germany. He pointed out, however, that these included a considerable quantity received from that country under the Reparation Clauses of the Treaty of Versailles. In the opinion of the Government, the existence of a strong synthetic dye-making industry was essential to the defence and security of the United Kingdom, and in pursuance of the pledges given on several occasions, proposals to protect the industry for a time, so as to enable it to be placed on a secure foundation, would be embodied in a Bill relating to key industries, which would be introduced and proceeded with as soon as possible.

In reply to a question by Mr. GRATTAN DOYLE,

Sir ROBERT HORNE said the subscribed capital of the British Dye Stuffs Corporation was £4,119,003 in preference shares, £4,089,811 in preferred ordinary shares, and £993,279 in deferred ordinary shares. Of this, £850,001 of preference shares and £850,000 of preferred ordinary shares had been subscribed for by the Government.

Mr. GRATTAN DOYLE asked Sir Robert Horne if he was aware that on May 15, 1918, the President of the Board of Trade stated that the importation of all foreign dyestuffs should be controlled by a system of licence for a period of not less than ten years after the war? This declaration was repeated by the President of the Board of Trade on July 25, 1918, only more emphatically, and again on Feb. 26 last.

Lieut.-Colonel CROFT asked if these licences, as promised, were in force at the present time.

Sir R. HORNE replied not yet.

Mr. GRATTAN DOYLE asked if, in view of the serious condition of this national asset, the British dyes industry, Sir Robert was prepared to introduce a Bill dealing specially with it.

Sir R. HORNE said he thought it would be a great mistake to deal with only one industry. There were many others, also key industries, to be dealt with. He should prefer, and he was sure the House would find it more convenient, to deal with them all together.

Mr. GRATTAN DOYLE asked the Prime Minister whether he was aware of the serious position of the British dye industry, of the increasing importation of German dyes in competition therewith, and whether an agreed Bill could be introduced at once to carry out the Government pledges in this respect.

The PRIME MINISTER said a Bill dealing with key industries would be introduced and proceeded with as soon as possible; but it would be inadvisable to limit such a Bill to the dye-making industry.

German Made Gas-Mantles.

Mr. G. TERRELL asked the President of the Board of Trade if he was aware that natural monazite sand from India was supplied to German manufacturers as raw material for making gas-mantles, and ultimately that such mantles were exported to this country, and that, in consequence of the collapsed exchange, it was impossible for British manufacturers to compete; that one British firm had discharged their workpeople, and were confining their activities to the sale of German made mantles.

Sir R. HORNE replied that he had no information as to the extent to which German manufacturers were at present obtaining supplies of natural monazite sand from India; but he was having inquiries made, and would inform Mr. Terrell of the result. The whole question of collapsed exchanges was receiving the earnest attention of the Government. He would be glad to consider any detailed information as to the particular firm mentioned in the question.

Fatal Accident at the Saltley Gas-Works.—A curious accident, terminating fatally, occurred last Friday at the Saltley Gas-Works, Birmingham, to George Thorne, a stoker, who was removing coke from the travelling wheel of a quencher when his shovel was caught. In attempting to extricate the implement, he was thrown violently between the machine and an iron standard, the effect of which was severely to crush his head and ribs.

Gas Supply in Birmingham.—Notwithstanding the withdrawal of the Lighting, Heating, and Power Emergency Order, the Birmingham Gas Committee express the hope that consumers will continue to exercise the utmost economy in gas and coal for at least a further ten days. By that time it is hoped normal supplies of coal will have been resumed. The Gas Department have had to draw large quantities of coal from stock since the beginning of the strike; and it is necessary that these withdrawals should be replaced before the winter loads have to be met.

Records at Blackpool.—Blackpool's gas output last year (768 million c.ft.), and the income of £169,198, were both easy records, though the net profit at £3636 was lower than in any year since 1887. Nearly 50,000 tons of coal and cannel were carbonized. There are 13,988 ordinary gas consumers, and 4358 coin-meter users. The coin-meters produced £18,667; and the weight of the copper collected was 41 tons 13 cwt. 1 qr. 15 lbs.—an increase of nearly 5 tons on the previous year. Gas deposits in hand total £15,120. The Gas Committee sold 17,689 tons of coke, 3166 tons of tar, and 465 tons of concentrated ammonia. There are 2612 street gas-lamps; and the total length of mains is 120½ miles.

MISCELLANEOUS NEWS.

GAS REGULATION ACT APPLICATIONS.

Notice has been given in the "London Gazette" of the fact that application has been made by some gas undertakings to the Board of Trade under section 1 of the Gas Regulation Act for Orders providing for—(*a*) The repeal of any enactments or other provisions requiring the undertakers to supply gas of any particular illuminating value, and the substitution therefor of power to charge for thermal units supplied in the form of gas; and (*b*) The modification of the statutory or other provisions affecting the charges which may be made by the undertakers by substituting for the maximum price per 1000 c.ft. now authorized, with an addition to meet increases in the costs and charges of, and incidental to, the production and supply of gas by the undertakers since June 30, 1914, a maximum price per therm (*i.e.*, 100,000 B.Th.U.).

A copy of the applications made to the Board of Trade, and of all the documents submitted therewith, may be inspected, free of charge, at the gas offices concerned.

Any local authority or person desiring to make representations with regard to the application, may do so by letter addressed to the Assistant Secretary, Power, Transport, and Economic Department, Board of Trade, Great George Street, S.W., and posted not later than the date specified in the notice.

Barnard Castle Gas Company.

The maximum prices now authorized in respect of the supply of gas by the undertakers are 3s. 6d. per 1000 c.ft. in the parishes of Barnard Castle and Startforth and 4s. 6d. in other parishes or places within the limits of supply; and the prices which they have asked the Board of Trade to substitute for these are 1s. 8·2d. and 1s. 10·6d. respectively per therm.

Bedford Gas Light Company.

The standard price now authorized in respect of the supply of gas by the undertakers is 3s. 6d. per 1000 c.ft.; and the price which they have asked the Board of Trade to substitute for this is 1s. 5d. per therm.

Colchester Gas Company.

The standard price now authorized in respect of the supply of gas by the undertakers is 3s. 3d. per 1000 c.ft. for gas supplied by them to persons within the borough of Colchester who shall burn the same by meter other than a prepayment meter; and the price which they have asked the Board of Trade to substitute for this is 1s. 5d. per therm.

The undertakers are authorized to charge differential prices for gas supplied by them as follows:

(*a*) In the parish of East Donyland an increase of not more than 6d. per 1000 c.ft. over the prices for the time being charged to consumers within the borough of Colchester.

(*b*) Within the remainder of the limits of supply a like increase of 9d. per 1000 c.ft.

(*c*) For gas supplied to the Corporation of Colchester for public lamps:

(1) When the total amount of gas supplied by the undertakers to the Corporation of Colchester shall exceed 5 million and not exceed 9 million c.ft. per annum, 3d. per 1000 c.ft. less than the lowest price charged by the undertakers within the borough of Colchester for lighting purposes only to consumers other than Government Departments.

(2) When the total amount of gas so supplied exceeds 9 million c.ft., 6d. per 1000 c.ft. less than such lowest price.

And the amounts per therm which the undertakers have asked the Board of Trade to substitute for such amounts per 1000 c.ft. are as follows: For the amount of 6d. per 1000 c.ft. in paragraph (*a*), the amount of 1·2d. per therm; for the amount of 9d. per 1000 c.ft. in paragraph (*b*), the amount of 1·8d. per therm; for the amount of 3d. per 1000 c.ft. in paragraph (*c*) sub-paragraph (1), the amount of 0·6d. per therm; and for the amount of 6d. per 1000 c.ft. in paragraph (*c*) sub-paragraph (2), the amount of 1·2d. per therm.

Corbridge Gas Company.

The standard price now authorized in respect of the supply of gas by the undertakers is 4s. 2d. per 1000 c.ft. within the parishes of Corbridge and Dilston (east of the Devil's Water), and 5s. per 1000 c.ft. of gas supplied by them beyond the said parishes; and the price which they have asked the Board of Trade to substitute for this is 1s. 7½d. per therm within the parishes of Corbridge and Dilston (east of the Devil's Water), and 1s. 9½d. beyond the said parishes.

Frodsham Gas and Water Company.

The standard price now authorized in respect of the supply of gas by the undertakers is 6s. 6d. per 1000 c.ft.; and the price which they have asked the Board of Trade to substitute for this is 1s. 8d. per therm.

Hexham Gas Company.

The standard price now authorized in respect of the supply of gas by the undertakers is 3s. 2d. per 1000 c.ft. for gas supplied within the area of the urban district of Hexham; and they may charge in that part of the area of supply which is outside the urban district of Hexham a price not more than 1s. per 1000 c.ft. in excess of the price for the time being charged in the urban district. The price which they have asked the Board of Trade to substitute for this price is 1s. 4d. per therm for gas supplied within the urban district of Hexham; and in that part of the area of supply which is outside the urban district of Hexham a price not more than 2½d. per therm in excess of the price for the time being charged in the urban district.

Newport (Mon.) Gas Company.

The maximum price now authorized in respect of the supply of gas by the undertakers is 6s. 2d. per 1000 c.ft.; and the price which they have asked the Board of Trade to substitute for this is 1s. 8d. per therm.

Oxford Gas Light and Coke Company.

The standard price now authorized in respect of the supply of gas by the undertakers is 3s. 2d. within the City of Oxford, and 3s. 8d. without the city, per 1000 c.ft.; and the price which they have asked the Board of Trade to substitute for this is 15·4d. within the city, and 17d. without the city, per therm.

Pinner Gas Company, Ltd.

The standard price now authorized in respect of the supply of gas by the undertakers is 4s. 7d. per 1000 c.ft.; and the price which the undertakers have asked the Board of Trade to substitute for this price 1s. 6d. per therm.

Preston Gas Company.

The standard price now authorized in respect of the supply of gas by the undertakers is 3s. 4d. per 1000 c.ft.; and the price which they have asked the Board of Trade to substitute for this is 1s. 5·6d. per therm.

Sheffield Gas Company.

The maximum price and the other prices authorized or prescribed, and the prices which the undertakers have asked the Board of Trade to substitute therefor in accordance with paragraph (*b*) above, are as follows:

(i) For the maximum price of 4s. per 1000 c.ft., prescribed by section xcii of the Sheffield Gas Act, 1855, a maximum price of 1s. 2d. per therm;

(ii) For the price of 3s. 6d. per 1000 c.ft., on which the rate of dividend payable on the undertakers' ordinary "B" stock is dependent, as mentioned in section 23 of the Sheffield Gas Act, 1917, a price of 1s. 0·4·5d. per therm;

(iii) For the respective prices of 3s. 3d., 3s., and 2s. 9d. per 1000 c.ft. on which the rate of dividend payable on the undertakers' ordinary "C" stock is dependent, as mentioned in the said section 23, the respective prices of 1s. 0 1-5d., 11 3-5d., and 11d. per therm; and

(iv) For the price of 3s. 6d. per 1000 c.ft. on which the remuneration payable to the Directors of the Company is dependent under section 7 of the Sheffield Gas Order, 1890, the price of 1s. 0·4-5d. per therm.

Southampton Gas Light and Coke Company.

The maximum prices now authorized in respect of the supply of gas by the undertakers are 5s. 2d. per 1000 c.ft. within the county borough of Southampton and the urban district of Eastleigh, and 6s. 2d. per 1000 c.ft. within the remainder of the Company's area of supply; and the prices which the undertakers have asked the Board of Trade to substitute for these prices are 1s. 6d. per therm within the county borough of Southampton and the urban district of Eastleigh, and 2s per therm within the remainder of the Company's area of supply.

Watford Gas and Coke Company.

The standard price now authorized in respect of the supply of gas by the undertakers is 4s. 1d. per 1000 c.ft.; and the price which the undertakers have asked the Board of Trade to substitute for this price in accordance with paragraph (*b*) above is 1s. 6½d. per therm.

Welwyn, Knebworth, and District Gas Company, Ltd.

The maximum price now authorized in respect of the supply of gas by the undertakers is 4s. 4d. per 1000 c.ft.; and the price which the undertakers have asked the Board of Trade to substitute for this price in accordance with paragraph (*b*) above is 1s. 7d. per therm.

Westgate and Birchington Gas and Electricity Company.

The maximum price now authorized in respect of the supply of gas by the undertakers is 4s. 9d. per 1000 c.ft.; and the price which the undertakers have asked the Board of Trade to substitute for this price in accordance with paragraph (*b*) above is 1s. 11d. per therm.

SUNDAY GAS TESTING.

London County Council Strengthening the Staff of Examiners.

The Public Control Committee, reported to yesterday's meeting of the London County Council that the work of testing the gas supplied by the three large Metropolitan Gas Companies is carried out at seventeen official testing-places in London by a staff of 33 part-time gas examiners. Of these examiners, seventeen are regularly employed on week-days, and the remaining sixteen form a reserve from which gas examiners are drawn to perform Sunday and emergency week-day duty. Owing, however, to a variety of circumstances, only six of these reserve gas examiners are now available for Sunday duty. It has accordingly been necessary to employ the available gas examiners at two testing-places each on Sundays, and to call upon such of the week-day examiners as are willing to do so to undertake Sunday duty. The difficulty has been accentuated by a recent change prescribed by the Metropolitan Gas Referees in the method of testing the gas of the South Metropolitan Gas Company. In view of the long and complicated tests thereby rendered necessary, gas examiners are unwilling to test at more than one station in this Company's area on Sunday. In these circumstances, the Committee were of opinion that steps should at once be taken to strengthen the staff by adding eleven gas examiners to the panel approved by the Council in 1915. As each gas examiner is paid only in respect of the actual tests carried out by him, no additional expenditure is involved in the proposal.

Market Bosworth Gas Light and Coke Company, Ltd.—At an extraordinary general meeting of the Company on the 8th ult., it was resolved "That the Company be wound-up in voluntary liquidation, for the purpose of transferring the business to Mr. J. H. Shepherd for the sum of £1400; and that Mr. Chas. J. Leopold Ray, of No. 99, Corporation Street, Birmingham, be appointed Liquidator for the purpose of such winding-up."

EAST WEMYSS AND BUCKHAVEN GAS ARBITRATION.

The Case for the Town Council.

The case for the East Wemyss and Buckhaven Gas Light Company, Ltd., in an arbitration to determine the price to be paid for their undertaking by the Burgh of Buckhaven, Methil, and Innerleven was given in the "JOURNAL" for Oct. 20 [p. 148]; while part of the Council's case was outlined the following week [p. 223]. The evidence for the Council is completed to-day.

The arbitration took place in the North British Station Hotel, Edinburgh, with Lord ASHMORE as Oversman. Mr. HENRY WOODALL acted as Arbitrator for the Town Council; and Mr. W. DOIG GIBB, for the Gas Company.

Counsel appearing were: Mr. ALEXANDER MONCRIEFF, K.C., and Mr. J. B. PATON (instructed by Messrs. W. & J. OGILVY SHEPHERD), for the Company; Mr. A. H. B. CONSTABLE, K.C., and Mr. WALTER T. WATSON (instructed by Mr. ROBERT LESLIE and Messrs. PEARSON, ROBERTSON, and MACONOCHIE), for the Town Council. Mr. J. A. STUART was Clerk and Legal Assessor.

Mr. *W. R. Herring*, in reply to Mr. CONSTABLE, said the site of the works was badly placed for railway accommodation. There was evidence of subsidence both as regards the retort-house and the gas-holder tanks. The works were situated on the foreshore, along which the main-pipe was laid, with the result that it was occasionally stripped bare for a considerable distance. Since 1914, a large portion of one of the mains had been washed into the sea, and had to be relaid. In another place the pipes were exposed, and laid upon wooden trestles. They could not be left like this. The leakage was undoubtedly heavy; and what was worse, it was very variable. It suggested subsidence in connection with the mains; and, to his mind, this was the part of the undertaking that had been most neglected. The consistently high leakage indicated that enough had not been spent on maintenance. He differed from Mr. Napier as to the producing capacity of the works, and the extent to which the existing output could be increased. Already extensions were needed; and the slightest further increase in the demand for gas would necessitate reconstructing the works. As to the sum of £55 which had been added in the calculations, to bring the manager's salary up to a reasonable amount, the man, for the work he did, was very much underpaid. Really, £2 10s. per week was an absurd sum. He accepted Mr. Henderson's figure of £346 for maintenance of works. So far as mains and service-pipes were concerned, there was no figure in the accounts; and it was necessary to insert one before the maintainable profit could be arrived at. He based his calculations upon 7½d. per 1000 c.ft., which he considered was, even in an ordinary class of undertaking, a fair average sum representing the cost of repairs and maintenance. This was quite a recognized figure, without depreciation of stoves. He was quite satisfied that Mr. Henderson had made a thorough investigation of the affairs of the Company.

Further examined, witness said there had to be considered, in arriving at the amount of maintainable profit, the extent to which the profit of the year had been sunk in capital expenditure. In his view, the Company were wrong in appropriating revenue for capital purposes; and to the extent to which they had done it, he suggested it should be taken out of their profits as not being maintainable.

Mr. CONSTABLE: Is the basis to this distinction between profit that is distributed as dividend and profit that is employed for further capital expenditure to be found in the old rule which, upon statutory powers being given to a company, only allows the full percentage upon capital *bona fide* subscribed, and allows a diminished percentage upon capital which is taken from the consuming community.

Witness: I would rather say that it is the invariable practice of Parliament to consider the cash put into the Company. They will not grant more than 10 p.ct. on the cash subscribed, and will grant 5 p.ct. on the whole of the so-called improvement capital, which really means capital provided out of the excess price charged for gas.

The OVERSMAN: When a company comes in Scotland for statutory powers, it gets as a compensation for being limited to the 10 p.ct. a security that a non-statutory company has not got. As regards the deduction for what has been dedicated from profits to capital, are you suggesting the whole of it should come off?

Witness: The way I should like to put it is that the profit brought out by us without that item is still about equal in pence per 1000 c.ft. to what an ordinary statutory company's profits amount to. That is to say, it will amount to about 9d. per 1000 c.ft. to pay the dividend, which is about the normal figure. In fact, it is less than 9d. in very many cases. This was when reducing the maintainable profit by the full £445.

Whereas in this case £1311 would yield 14d. per 1000 c.ft.?—Yes; and that is an excessive profit for any statutory company. Had the figure been only £100 in the accounts for this particular year, then I would not have thought it fair to take note of it; but the sum is so large—though nearly £200 less than in the preceding year.

Examination continued: The possibility of electrical competition—which he thought in this area would be serious—had to be considered in connection with the maintainable profit; and the high price of gas charged was also of importance. To-day there was only a difference of 5d. per 1000 c.ft. in the prices charged to ordinary and prepayment consumers. All the increased consumption was by the more expensive system; and 5d. was not sufficient to cover the extra cost. So to that extent the profits were not maintainable. On the question of the multiplier, he agreed generally with the views that had been expressed by Mr. Henderson. There was a sort of recognized distinction between the multiplier applied to a statutory and to a non-statutory gas undertaking. It was generally agreed at two years; but sometimes even five years were asked for. They had taken two years on this occasion. It was his experience that for the last twenty years, so far as one could judge, the multiplier which had been taken in the course of proceedings for the valuation of gas undertakings had been steadily falling. It was in consequence of the largely increased returns on all classes of stocks and shares that the multiple was so low.

Cross-examined by Mr. MONCRIEFF, witness said he was consulted by the Town Council before they made the £15,000 offer. He took full particulars for a structural valuation, so as to enable him to have the whole thing in his mind before advising the Council as to what he thought was a fair offer to make. The figure of £15,498 was arrived at from the maintainable profit point of view. Careful investigation was made of what the real profits had been, and what they were likely to be in the future.

The OVERSMAN: Does the undertaking include the money in the bank and in hand, the outstanding debts due to the Company, and the stocks of coal, gas, purifying materials, and residual products?

Mr. MONCRIEFF: I take it that all these assets are carried as part of the undertaking, except, in terms of the agreement now reached, the workmen's houses. All the stock-in-trade that makes the profit must be carried in the valuation.

Cross-examination resumed: At that time (five years ago), £1000 was what he considered to be the maintainable profit of the concern, under the conditions then prevailing; and then he applied a suitable multiplier. The figure was arrived at on these elements alone, without regard to any other element. The structural value and other factors were merely used as a test.

Mr. MONCRIEFF: As to maintenance, is it because 7½d. per 1000 c.ft. is a sound figure to take as average expenditure apart from local conditions, or because 7½d. is appropriate to East Wemyss on account of its special features, that you suggest it as suitable?

Witness: In dealing with questions like this, you take a broad view first. I stated that the 7½d. was the factor for fifty odd undertakings in different parts of the country.

How do you explain that, in the case of nine Scottish companies, the pre-war expenditure for a period of four years for these items worked out at 5·34d.?—I had not these works before me; and I cannot explain.

Witness went on to say that he saw one of them was 6·9d.; and he should think that the man with 2·65d. had grossly neglected his maintenance. Depreciation of cookers was an extra figure.

Mr. MONCRIEFF: Is there any reason why these means—that is, cookers—of increasing the production of gas should be treated differently from the other elements in the maintenance account?

Witness: An ordinary gas undertaking must not appropriate money for depreciation. It may renew annually to the full extent of its original cost; but it must not depreciate. The practice that has arisen in the supply of gas cooking-stoves, and all the other things, justifies depreciation, because they suffer damage. They get thrown about, and are badly used. It has therefore been recently thought reasonable that in addition to maintenance, there should also be an annual charge for depreciation. The average of fifty undertakings amounts to 2·17d. per 1000 c.ft.

Is it your view that the part of the profits which was put into the business, instead of being distributed, should not form an element in valuing the undertaking?—I have satisfied myself that this has been entirely applied to capital purposes, and as a consequence your profits are greater. I am buying your profit; and therefore I should not have to buy that capital.

Can you see that if you buy my profits you get the capital as part of the consideration in return for the purchase price, and do not pay extra for it?—I do not agree there. As a result of this practice of contributing, let us say, one-half of the capital out of the revenue of the Company, your profits are greater by one-half; and therefore I am buying that greater profit, and you cannot expect me to buy also the capital which I have subscribed.

Does it matter to the Town Council, who are the buyers, how the Company in the past have allocated this profit?—Yes, because if they have been raising a profit which the price of gas would not justify, then it is not a maintainable profit.

Is it not significant that the community accepted the price of gas as reasonable, seeing that there is no record of any protest?—The profits were not disclosed here.

Did you ever hear that a non-statutory company should suffer a diminution of the normal multiplier?—It is the invariable practice.

Can you explain upon what footing that practice is arrived at? If a multiplier be introduced in order to capitalize the profits, why should the multiplier be reduced because of the lack of monopoly rights?—For one thing, you are giving them a more secure investment than they have in the local Company.

Mr. WOODALL: With regard to maintainable profits, is it not a fact that, as a rule, the maintainable and the distributable profits are about the same?

Witness: Yes.

In this case that does not apply?—No, it does not apply.

If you were to take the figure given by Mr. Gowans of approximately £1600 as the maintainable profit, that would give a return of about 20 p.ct. on the share capital. Do you know of any undertaking in Scotland where such a return has been paid, and do you think that such a return could possibly be maintained?—I do not know of one where such a high return is paid. I am quite sure it would not be maintainable if it were known that it was being paid.

Do you consider that to give an adequate supply nowadays there should be laid in streets any mains of less diameter than 3 in.?—No, I think not. In this case, they have had to put in special apparatus to boost the gas into the town, though the town is at a higher level.

Did you notice in the statement put in that over 60 p.ct. of the mains were under 3 in.?—I have not worked out the percentage; but I saw it was a very large quantity.

Mr. DOIG GIBB: I think you said the practice was to give 2½ years' extra purchase for statutory companies?

Witness: No, that is not quite correct. What I said is 2½ years less for a non-statutory company.

Is it not the fact that that was always claimed; but in very few arbitration cases was it possible to know whether the claim had been given effect to?—If awards would only give us details, then it would save us a lot of work. As a rule, it is all wrapped-up.

Mr. *Alexander Harper* was then called to give evidence as to the value of house property in East Calder.

Mr. MONCRIEFF, addressing the Tribunal for the Company, said it

had been suggested that a sum of £10,636, arrived at upon what professed to be, first, an estimate of actual profits, and, secondly, a forecast of their maintainability, was the sum which should be awarded; whereas the same parties, proceeding upon skilled advice at an earlier stage of the proceedings, offered a sum (which he believed was still open to acceptance on the pleadings) exceeding what was now proposed by no less than 50 p.ct. With regard to the capital account, the shareholders of the Company were entitled to equal consideration whether they paid for their shares in cash or surrendered the right to distributing profits as dividends. The amount subscribed in capital, with the additional sums shown as expended on works, came to well over £15,000; and he suggested that the Court should take this figure as being the value of the structure alone—something much less than the total which must be awarded. There was firm warrant for the view that the profits disclosed upon account, of some £1600 for the year 1914, were likely to be maintained. It was said that in the account year there was available for transfer to capital a sum of £425, and that this should be deducted before arriving at the maintainable profit. What would be the result of giving effect to this suggestion? Probably the argument was that the price of gas which built-up the profits of the year was unduly high. But even if this were the case, it was the price paid by the consumers to the Company in 1914. The result therefore of the application of the present suggestion would be, not that this money would ever be paid back to the consumers from whom it was taken, but that it would be transferred to the purchasers of the undertaking. He could not see upon what footing such a transfer should be made. Following invariable practice, they had suggested a multiple of twenty years; but he did not think that one could reasonably maintain this proposition up to its full extent. The numerator should be that which attached to gilt-edged securities, or in the neighbourhood of sixteen years. This, applied to his figure of £1600 as the profits of the account year, brought out a figure of £25,600. To this he would ask them to add one-half year's purchase of the £1600 in respect of dispossession, and £800 in respect of the workmen's houses, bringing the total up to £27,200.

Mr. CONSTABLE said he presumed the Company would pay their dividend up to June 30, and from that time forward the undertaking would belong to the Council. As to the maintainable profit, his proposition was that profit set aside and used for capital purposes could not be treated in the same way as profit which was necessary to pay a fair return upon invested capital. In the first place, it was opposed to the practice of Parliament. The Company, not being statutory, had been consistently following a practice that, for good and sufficient reasons, would not have been sanctioned in the case of a statutory company. If the community once began to realize that an undertaking supplying a public necessity was, so to speak, "feeding the dog with its own tail"—by first taking an extra profit out of the people by charging an additional price, and then capitalizing it in order to give more gas—the community would come in and put a stop to it by exercising their statutory powers. The various deductions he claimed, and which he explained at length, brought out a maintainable profit of £1117. Then the site was not a good one, and the plant was very near the limit of output. The price of gas was still high; and there was the probability of electrical competition to consider. As to the multiplier to be applied, the shareholders were not entitled to be put in a better position than that which they now occupied. If they took twelve years, and applied it to his figure of £1117, they would get a result of £13,404, *plus* £376 for the two houses; while fourteen years, similarly applied, would give £15,638, *plus* £376. The former would give nearly £2 per share; and the latter considerably over £2 per share. The interest at 6½ p.ct. would yield a very much higher income than the shareholders of the concern had ever before received.

The OVERSMAN remarked that the Tribunal had been gratified to notice the atmosphere of fairness that had existed on both sides.

NEW GASHOLDER AT STAFFORD.

Mention was made in the "JOURNAL" a fortnight ago of the inauguration of a new holder at the Stafford Corporation Gas-Works, of a million c.ft. capacity, as part of the large extension scheme which growing demands necessitated. The contract for the construction of the holder was secured by Messrs. C. & W. Walker, of Donnington; and the erection has been carried out under the supervision of Mr. W. M. Valon (the Gas Engineer), who designed the holder. The cost has been £14,400; but at present prices it would have been £45,600.

Tea was presided over by Mr. R. J. Young (the Chairman of the Gas Committee); and the Mayor (Dr. F. M. Blumer) congratulated the Committee on the successful completion of the work. He assured the Committee that they had all much appreciated the great work, the skill, the ability, and the devotion which the Engineer had shown. He had pioneered several great pieces of work in connection with the undertaking since he had been in charge; and their congratulations were due to him.

In reply, Mr. Young pointed out that the output of gas in 1880 was 70 million c.ft. In 1890 it was 95 millions, or an increase in the first ten years of 25 million c.ft. By 1900 it had increased to 158 millions, or a further increase of 63 millions. In 1910 it had increased to 202 millions, equal to 44 millions in the ten years. For the last ten years it had increased to 360 millions, or 158 millions in the ten years. In looking at these figures, one was struck with the increased output each decade, but particularly in the last, in which the increase was no less than 158 million c.ft., or 30 millions more than in the whole of the previous thirty years. Owing to this largely increased output it had been necessary during the past ten years thoroughly to re-organize and extend the works; and the gasholder, which had been brought into use that day was practically the completion of the extension scheme entered upon by the Gas Committee in 1912. In fact, the only part of the scheme not now completed was the erection of new purifiers. The scheme was entered upon at the end of 1912, and in the ordinary course of events would have been completed by the end of 1915. When one recalled that in the Engineer's original report he pointed out to the Committee that the old retorts were nearing the end of their useful life, and that he did not think it would be possible to run them after 1915, he (the Chairman) felt that Stafford was to be congratulated in that its works were in the hands of such a capable man as Mr. Valon. He had already pointed out the great progress of the works during the past ten years, during the whole of which time Mr. Valon had had charge; and it was without doubt due to the skill and ability he had displayed that the works were now in such an excellent condition. Mr. Valon was responsible for preparing the reconstruction scheme. With the exception of the vertical retorts and gasholder, the whole of the reconstruction work had been carried out by direct labour. He should also like to commend Mr. T. H. Poulson and his staff for the excellent way in which they had co-operated. Great credit was due to them for having maintained an uninterrupted supply of gas in spite of the difficulties of plant and the troubles of the war years. As the increased output quarter by quarter had not only been maintained but improved upon during the past five years, they were again faced with the necessity of further extensions; and there was no doubt extra carbonizing and purifying plant would have to be installed at a very early date. The re-organization of the works had resulted in great improvement in efficiency.

The health of "The Contractors" having been submitted, with due acknowledgment of the excellent manner in which the work had been carried out, Mr. R. J. Milbourne (of Messrs. C. & W. Walker) spoke of the difficulties the firm encountered during the period of the war. He added that the contract was the longest job with which he had ever been connected. The members of the Gas Committee acted more as though they were paid Directors, than as gentlemen who devoted themselves to the work voluntarily. The figures the Chairman had given pointed to the fact that the Committee had every reason to be thankful to their Manager for having produced such extraordinary results. He congratulated the town on having secured a holder which was one of the most up-to-date it was possible to have. On behalf of the contractors, he presented the Mayoress and Mrs. Young each with a silver rose bowl, suitably inscribed, as a memento of the day's proceedings.

ALLEGED PROFITEERING IN METER-RENTS.

Complaint Dismissed.

At a meeting of the Tetbury (Glos.) Profiteering Committee, held at the Town Hall on Friday last, a complaint was laid by Mr. Maurice J. Pride, of Tetbury, against charges by the Tetbury Gas Company, Ltd., for the "rent of meters." Mr. Pride stated that he was supplied by the Tetbury Gas Company with three meters—a 3-light meter and two 5-light meters—the cost of which to the Company was in 1906, when the two 5-light meters were fixed, approximately £1 7s. 4d. each, and of the 3-light meter fixed in 1914, £1 5s. 3d.—total £3 19s. 11d. for the three meters. He had paid the Company rent for the 3-light meter, and for one 5-light meter since they were fixed. No rent was directly charged for the other 5-light meter—that being a separate meter for gas supplied for cooking and non-illuminating purposes, and for which a separate rate or price was charged for gas to include the rent of this meter. So that he had already paid the Company more in "rent" than the actual cost of the meters. He was now asked to pay at the rate of £1 2s. per annum as "rent of the meters," which had cost the Company £3 19s. 11d., and which had already been in use and "rented" six and fourteen years respectively. He contended that this was not only an injustice but gross profiteering; the charge being for rent of meters only.

Mr. Pride pointed out that no repair had been necessary to the meters since they were fixed; and normally, in a dry place, as these meters were, no repair should be necessary during the next sixteen years. The charge which was the subject of his complaint was for the rent of the meters, and not for repairs, &c. Neither the price of materials nor of labour should affect the price to be paid for the rent of these meters, at any rate until the Company were put to the expense of supplying new ones. He urged that the present cost of production of gas, the increased cost of coal, labour, &c., had nothing whatever to do with the rent of the meters which were purchased so long ago. Further, he considered that any direct charge for rent of meter was unjustifiable, inasmuch as the Company had received payment for every meter for which they were now claiming (except, of course, any new ones in stock which may not have been charged-up), it being the Company's practice to charge for the cost of all meters purchased, not as a capital expenditure, but as a charge to the revenue or profit and loss account. In this way customers of the Company had paid, and were paying in the charge for gas supplied, sufficient to cover the cost of the new meters bought by them during each half year and for old ones repaired—this before the amount of the Company's profit for dividend was arrived at. It followed, therefore, that if the Company sold their concern they would sell and receive payment again for every meter they possessed.

Mr. Pelly (one of the Committee) considered the cost of a meter to-day and the net cost when bought to be a fair basis on which to charge a rent. The information before them was that the life of a meter was ten years. But Mr. Pride replied that this had already been in use fourteen years, and might reasonably be expected to last another sixteen. He could vouch for meters having been in use over thirty years, though in exceptional cases to which he referred a meter might only last five years. He spoke from practical experience.

Mr. Fowles (the Chairman) said he thought the Company, by paying a 5 p.ct. dividend on £5000 capital, was not apparently profiteering, to which Mr. Pride replied that the question of the Company's gross profit or dividend had nothing whatever to do with the question before them—the alleged profiteering on the rent of the meter. If so, it followed that no action could ever be sustained against a man who chose to make an excessive charge for a yard of linen or a pound of tea in order to make his whole business show a return of 5 p.ct. on his capital.

The Committee dismissed the complaint, on the grounds that there was no *prima facie* case.

VERTICAL RETORTS OR COKE-OVEN GAS FOR LEEDS.

Ministry of Health Inquiry.

There was an inquiry at the Leeds Town Hall last Wednesday, by Mr. W. M. Cross, of the Ministry of Health, into an application by the Leeds City Council for sanction to borrow £286,103 in connection with the installation of vertical retorts at the Meadow Lane gas-works. The Town Clerk (Sir Robert Fox) represented the Corporation; and those present included Mr. T. K. Richardson from the Technical Adviser's Section of the Board of Trade Coal Mines Department, and Mr. Isaac Carr, M.Inst.C.E., Consulting Engineer of the Yorkshire Coking and Chemical Company, Ltd., and the Glasshoughton Collieries.

The Town Clerk explained that an inquiry into the proposed extension of plant at the Meadow Lane gas-works took place early in 1915, when a letter was received from the Ministry of Health drawing attention to the views of the Treasury on the necessity for economy, and suggesting that the Corporation should accept a smaller amount to carry out necessary work for the time being. In consequence, the expenditure was restricted to £28,618; but as this figure proved insufficient, sanction was obtained for borrowing a further sum of £8839. The total amount was used in erecting vertical retorts and necessary ancillary plant, which included a small railway to deal with the conveyance of coal to the retorts. The consumption of gas exceeded the supply, having regard to the necessity of maintaining the usual margin of about 15 p.ct.; and the horizontal retorts, which were old at the time of the previous application, being only sufficient to carry on during the emergency of the war, were now worn out. As a matter of urgency, therefore, it was proposed to put the gas-works in a proper condition for meeting the requirements of the city.

Mr. C. S. Shapley, the Engineer and General Manager of the Leeds Corporation Gas Department, said that not only were the horizontal retorts quite worn out, but the inclined retorts were almost finished. Negotiations had taken place since May, 1917, resulting from the offer of the Glasshoughton Colliery Company to supply between 2,000,000 and 3,000,000 c.ft. of coke-oven gas each day; but the Corporation were of opinion that it would be a much better business proposition to improve their own plant, as it was estimated that by so doing there would be an annual saving of £23,000, apart from other advantages. The disadvantages of the suggested fifteen years' agreement were that at the end of that time the Corporation would be entirely in the hands of the Colliery Company. The distance between the colliery and the gas-works was 11 miles; and the cost of laying connecting mains would be £89,000. Moreover, the coke-oven gas plant would not be under the control of the Corporation—the supply being subject to strikes of miners and breakdown of machinery; and experience with another colliery had shown that the supply varied considerably, with the result that it was difficult to maintain a regular standard in the quality of the gas. By manufacturing their own gas, the Corporation would retain control of plant, besides maintaining a regular supply of gas; and by taking advantage of improvements in methods of gas manufacture, they would be able to reduce the cost of gas.

Mr. Carr requested permission to be allowed to cross-examine this witness; but the Town Clerk, in raising an objection, described as an extraordinary way of doing public business the action of the Coal Controller in sending to the inquiry a representative, with the object of persuading the Corporation to buy gas from a company with whom they had refused to deal. The Corporation would certainly make representations on the matter. On being asked by the Town Clerk whether he was paid by the Coal Controller or the company, Mr. Carr said he was not in a position to answer the question; but he added that, without the intervention of the Coal Controller, he would not have been present.

Mr. W. R. Herring, M.Inst.C.E., Consulting Engineer to the Corporation, corroborated Mr. Shapley's evidence.

By the intervention of Mr. Richardson, Mr. Isaac Carr was enabled to give evidence on the negotiations which had passed between the Yorkshire Coking and Chemical Company and the Leeds Corporation relative to the supply of coke-oven gas. In answer to his inquiry, he elicited the information that the cost of making gas in Leeds for the twelve months ended March last was over 2s. 3d. per 1000 c.ft. Under the most favourable conditions, the offer which his clients had made would be less considerable than the gas could be produced at by Leeds providing its own manufacturing plant. He put in figures showing that Leeds actually sold less gas than was sold ten years ago. By accepting the offer of coke-oven gas, the carriage of from 50,000 to 60,000 tons of coal would be saved. His clients offered 2,000,000 c.ft. of gas per day; but there was a prospect of this quantity being increased. His estimates for the mainlaying costs from Castleford, 11 miles away, were much less than those put in by the Corporation witnesses, and were based on actual quotations for the work. By permission of the Inspector, Mr. Carr read a statement in which he challenged the figures given by Mr. Shapley and Mr. Herring, and said that by accepting the Company's offer the Corporation would save £9000 a year.

In answer to the Town Clerk, Mr. Herring said coke-ovens would produce 10,000 to 11,000 c.ft. of gas per ton of coal; whereas the yield of vertical retorts would be 17,000 to 18,000 c.ft. He estimated that the Corporation would save 60,000 tons of coal by adopting their own method.

Mr. Richardson called Mr. J. H. Brearley, M.Inst. C.E., of Southport, to give evidence. Answering the Commissioner, he said he had had actual experience of the working of verticals; and put in figures showing the results obtained in 1918 and 1919. It would be highly dangerous to adopt verticals on the basis of present residual prices. Tar was fetching very high figures; but there was no warranty that these prices would continue, while great anxiety was being felt as to the outlook for sulphate of ammonia. Accepting the figure of coke yield put in by the Corporation, he contended that if reasonable average prices were taken, there would be a charge for coal alone of 11d. per 1000 c.ft., instead of the credit of 18d. claimed by the Corporation.

SIMMANCE'S DEAD BEAT RECORDER

TAPE CHART PATTERN

For Pressure or Vacuum.

NO LIQUIDS USED.

The chart roll is renewed 6 times a year.

The record can be torn off at any interval.

Lowest Range: 0-2 inches water.

Highest Range: 0-300 lbs. per sq. inch.

Suitable for Gas, Air, Water, or Steam, and may be used on Crude Gas.

MAKERS:

ALEXANDER WRIGHT & Co., Ltd., WESTMINSTER

He also disagreed with the figure of 3½d. for repairs, which he regarded as much too low. In South and West Yorkshire, there was an annual estimated production of 17,000 million c.ft. of coke-oven gas, as against the total of 19,000 million c.ft. distributed by the gas undertakings in the area. When the conversion of waste-heat ovens into regenerative ovens was completed, the coke-ovens would produce more gas than the whole of the gas undertakings in that area. It was certainly the most sensible thing that this gas should be utilized for public supply purposes. If the big undertakings took a supply, it would be possible for smaller undertakings to get a supply *en route;* but otherwise this was not possible, owing to the mainlaying costs, unless they were adjacent to coke-ovens. Acting on his advice, other undertakings had agreed to take coke-oven gas.

The Town Clerk stated that after careful inquiry, the Corporation had come to the conclusion that the proposed scheme was the most economical that could be devised.

DARLINGTON GAS ENGINEERSHIP.

Appointment of Mr. A. E. Ruffhead—Honorarium for Mr. F. P. Tarratt.

To the Darlington Town Council last Thursday, the Gas Committee recommended that Mr. A. E. Ruffhead, present Assistant Gas Engineer to the Corporation, should be appointed Engineer and Manager, at a salary of £700, rising by annual increments of £50 to £850.

It was reported that Mr. F. P. Tarratt, the present Engineer, desired to commence at as early a date as possible his new duties as Chief Engineer to the Newcastle and Gateshead Gas Company; and it was recommended that arrangements should be made to this effect. It was also recommended that, as a mark of appreciation of long and valuable service, Mr. Tarratt be presented with an honorarium of £150.

Mr. DIXON, presenting the report, said, in regard to the new Manager, they received a number of applications, and picked out six. None of the applicants, however, had as good credentials as Mr. Ruffhead; and considering the years he had been at the gas-works, it was considered only a fair thing to give him the opportunity of showing what he could do. [Applause.] With regard to Mr. Tarratt, the Committee had unanimously voted him an increase of salary, which, had he stayed with them, would probably have been agreed to.

Alderman PEASE, supporting the grant to Mr. Tarratt, pointed out that he had stayed in Darlington for their benefit when his new position, in which he would receive a higher remuneration, was open to him. Mr. Tarratt had consented to remain with them until they were through with their troubles, when he might have gone practically at once, and left them in great difficulty.

An amendment that the Committee's recommendation should be referred back was defeated by twenty votes to six; and the minutes were agreed to.

TRADE NOTES.

[For "Journal" Advertisers.]

Richmond "Period" Gas-Fires.

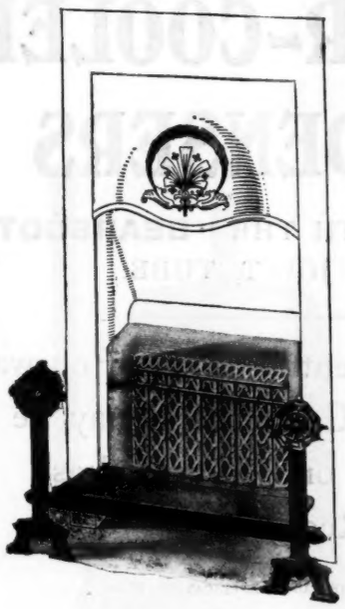
Under the title of "Richmond Period Gas-Fires," a very artistic 32-page crown quarto brochure is sent us by the Richmond Gas Stove and Meter Company, Ltd., in which the publishers have succeeded in reproducing the dignity and refinement of their "Period" series of gas-fires with marked effect. A very pleasing note is struck by numerous dainty sketches, in which fires are shown suitably installed; while the excellent illustrations of the fires themselves are certain to prove of immense value from the salesman's point of view. The book is prefixed by a handsome coloured illustration of one of the rooms at Richmond's new offices and show-rooms at Nos. 164-172, Queen Victoria Street, E.C.

Meldrum Furnaces and Acid-Resisting Metal.

Messrs. Meldrums, Ltd., of Timperley, near Manchester, have recently supplied, or have on order, furnaces for the following gas-works: Liverpool, Sunderland, Salford, Bournemouth, Tynemouth, Folkestone, Maidstone, Northwich, Newcastle, Southend-on-Sea, and South Metropolitan Gas Company. The firm have also just supplied to the South Metropolitan Gas-Works a large circulator operating with compressed gas, to mix the contents of a gasholder, to prevent stratification. "Meldrum" acid-resisting metal is in demand among those who have bye-product plants; and they have several sets of absorbers going through for sulphate of ammonia plants. They are busy on acid-resisting cocks and valves for gas-works, supplied in "Meldrum" acid-resisting metal throughout, or with "Regulas" metal body and "Meldrum" acid-resisting plugs, as well as in cast-iron, with either flanged or screwed ends, in all sizes up to 4 in.

Centrifugal Pumps in Gas-Works.

The recovery of benzole and other bye-products in gas-works has increased the demand for centrifugal pumps, because this type of pump—especially when driven by an electric motor—has been found the most convenient and suitable for the various duties in such plants, and when once introduced into the works it is generally adopted for other work for which steam or power driven reciprocating pumps have hitherto been used. To get the best out of a centrifugal pump, it is necessary to use a pump designed for the particular duty it has to perform, not only with regard to the quantity and head it has to deal with to obtain the highest efficiency, so as to perform the work to be done with the smallest amount of current absorbed, but also with regard to the nature of the liquid to be handled, to enable the pump to do its work with a minimum of wear and tear. The Pulsometer Engineering Company, of London and Reading, who make a speciality of high-efficiency centrifugal pumps, have many series of pumps of the most useful sizes, of different designs to meet all conditions of work, and have



RIGHT AS A TRIVET.

The "Entente" Inset Gas Fire fits neatly and firmly. All superfluous iron framework is eliminated, ensuring brick to brick contact between the coal grate and the gas fire.

The "Entente"

can be adjusted to suit the height and the depth of the grate. The brick, burner, injector, and fuels are all mounted on one common base-plate, thus securing correct alignment of these parts.

A sample in your Showroom will bring business

R. & A. MAIN, LTD.,

WORKS: Gothic Works, EDMONTON, N.18; Gothic Ironworks, FALKIRK; and Gothic Works, BIRMINGHAM.
SHOW-ROOMS AND BRANCHES: 25, Princes Street, Oxford Circus, W.1; 82, Gordon Street, GLASGOW; 18, Severn Street, Deansgate, MANCHESTER; 97, Millfield, BELFAST; 6, Narrow Wine Street, BRISTOL; 333, Queen Street, MELBOURNE.

upplied large numbers of these pumps to gas-works. Among their pumps may be mentioned water pumps to deliver large quantities of water used for condensing and cooling purposes; booster pumps to augment either the pressure or the quantity which the mains carry, or both; pumps for dealing with water containing a small quantity of tar; oil pumps to deal with the oil used in benzole plants, which is often at a temperature of 250° to 400° C.; and quencher pumps for supplying water for quenching coke. As the water in quenching coke is used over again, it carries grit in suspension which would in a short time wear out an ordinary centrifugal pump. The Pulsometer quencher pump is made to reduce the wear to a minimum. The parts liable to wear are of simple construction, and can be quickly replaced at a low cost, so that the main structure of a pump has a long life, and the efficiency can be kept up. In connection with pumping problems, it is frequently necessary to consider the quality of the water, because a turbid water may often cause trouble. The Pulsometer Company, who were one of the pioneers in mechanical filtration, are makers of the well-known "Torrent" filter, and have installed a number of these filters in gas-works for the purification of the water used in the works.

"Davis" Gas-Fires.

There have been received from the Davis Gas-Stove Company two lists dealing with their gas-fires. One of these is the new season's gas-fire list, in which are to be found prices and illustrated particulars of the firm's wide range of artistic and efficient gas heating-appliances, and of the Davis intense-flame burner, which is fitted to all their new fires and interiors. There are also to be found in it details of the Nautilus "Auto-Vent" gas-fire flue, about which of late so much has been said. The second list takes the form of a special folder for distribution among architects; and it shows how handsome the Davis gas-interiors (for building-in) look with appropriate surroundings.

B.W.G. Plant for Coruna, Spain.

Sn. Pablo Yvern, of Barcelona, who represents Messrs. Davison and Partner, Ltd., in Spain, has secured a contract from the Fabricas Corunesas de Gas y Electricidad Sociedad Anonima for a "Davison-Waller" water-gas plant, to be erected at the Gas-Works, Coruna.

The "Baseco" Patent Boiler.

As an adjunct to gas-heating installations, as well as in other circumstances, coke-fired boilers are making rapid headway in public favour; and among appliances of this character which claim attention, the "Baseco" patent boiler of Messrs. O. Bruster and De Launoit, of No. 4, Lloyd's Avenue, London, E.C., will not be overlooked. In this, efficiency and economy of fuel consumption are said to attain a very high level indeed; and it is equally suitable for hot-water heating—that is, for a continuous domestic supply—and for heating pipes and radiators, so that it possesses a wide range of usefulness. The distinguishing feature of the "Baseco" boiler is that it is constructed with a maximum amount of direct heating surface—*i.e.*, the heating surface is in direct contact with the flame and the action of the flame, thereby ensuring the efficiency and economy of fuel consumption already referred to. The other point of particular merit is the ready facility for thorough cleaning-out of sediment, &c. Four mudholes are provided; and the dome-top is bolted-on with a few bolts only. It can thus be very easily removed, when the whole of the interior is exposed to view. The fact that it is of cast iron renders it peculiarly suitable for use in districts where soft water, water containing acids in solution, or peaty water is encountered. Every boiler is tested to 120 lbs. per sq. in. The "Baseco" is made in three sizes.

Turbine Furnaces.

The Turbine Furnace Company, Ltd., of No. 5, Budge Row, E.C., have secured contracts from the following gas undertakings: The Coventry Corporation Gas Department (repeat order), to fit a 26 ft. by 6 ft. 6 in. Lancashire boiler with one of their sets of furnaces. The Brentford Gas Company, to fit a Cochran boiler with their furnace for vertical boilers. The Stockport Gas Department, for a set of furnaces for a 30 ft. by 8 ft. Lancashire boiler. The Gas Light and Coke Company (seventh order), for a set of furnaces for a Babcock type boiler at the Bromley works.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Nov.* 8.

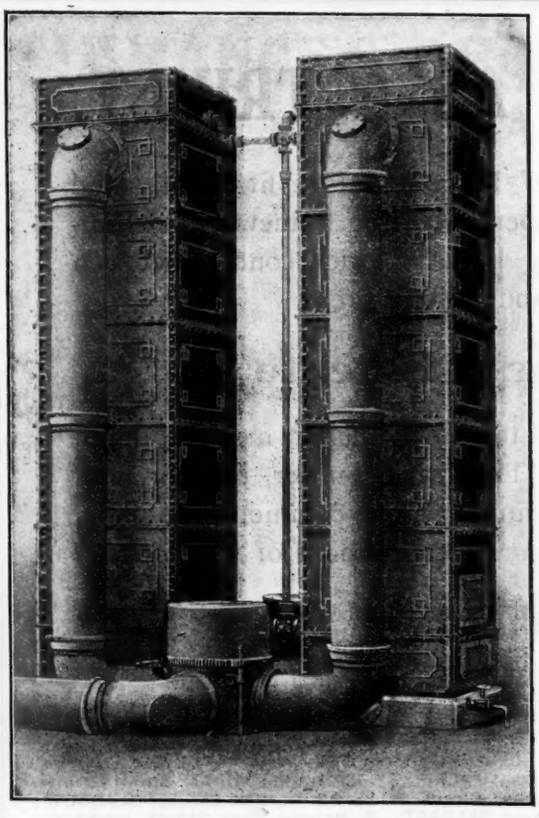
Pitch continues the main item of interest in the London market; the price being steady at not below 225s. net per ton f.o.b. makers' works. No doubt partly in consequence of the present favourable position of the freight market, shipments are very heavy. Creosote is firm, and is worth about 1s. 4½d. net per gallon in bulk, with only small quantities available. Other prices are: Solvent naphtha 3s. 6d. per gallon, pure benzole and pure toluol 4s. 3d. to 4s. 6d. per gallon, all net and filled into buyers' packages. Crude carbolic acid is dormant; and it is understood the production of it has almost ceased for the present.

There is no change in the position of sulphate of ammonia for th Home farmers.

Tar Products in the Provinces.

Nov. 8.

The average values for gas-works' products during the week were Gas-works coal tar, 128s. to 133s. Pitch, East Coast, 210s. to 215s. per ton f.a.s.; West Coast—Manchester, 200s. to 210s.; Liverpool, 200s. to 210s.; Clyde, 205s. to 215s. nominal. Benzole 90 p.ct. North, 3s. 1d. to 3s. 2d.; crude 65 p.ct. at 120° C., 2s. 3d. to 2s. 5d. naked at makers' works; 50-90 p.ct. naked, North, 3s. 2d. to 3s. 3d. Toluol, naked, North, 3s. 1½d. to 3s. 2½d. nominal. Coal tar crude naphtha in bulk, North, 1s. 2d. to 1s. 3d. Solvent naphtha,



"BEARSCOT" TUBING IN WATER CONDENSERS EXTENDS UPWARDS OF 130 MILES.

WATER-COOLED CONDENSERS

AS FITTED WITH THE "BEARSCOT" SAFE JOINT TUBE.

With our Central Port Fourway Valve the Condensers may be Reversed or Bye-passed as Required.

PARTICULARS WILL BE SUPPLIED UPON APPLICATION TO—

R. & J. DEMPSTER, LD.

Telegrams: "Scrubber Manchester" MANCHESTER.

LONDON OFFICE: 34, VICTORIA STREET, WESTMINSTER, S.W.1.

naked, North, 3s. to 3s. 2d. Heavy naphtha, North, 3s. 1d. to 3s. 3d. Creosote, in bulk, North, liquid, 1s. 0¾d. to 1s. 1¾d.; salty, 1s. to 1s. 1d. Heavy oils, in bulk, North, 1s. 1d. to 1s. 2d. Carbolic acid, 60 p.ct., 3s. 3d. to 3s. 6d. Naphthalene, £37 10s. to £40; salts, £10 to £10 10s., bags included. Anthracene, "A" quality, 1s. per minimum 40 p.ct.; "B" quality, nominal.

FROM A MARKET CORRESPONDENT.

Tar Products.

There is, of course, very little fresh to be said about tar products since my last report; but prospects of taking-up business under more normal conditions are distinctly better. Reports are to hand that pitch has been sold at slightly less than prices current two weeks ago. If this is correct, these sales were probably unimportant, and are no evidence of weakness. The Continental inquiry is maintained, and producers seem inclined to hold for even slightly higher prices for early shipment. Creosote is very firm, and much wanted for spot; and it is reported that some sellers are asking up to 1s. 6d. per gallon. There are buyers for forward delivery well into next year; and the general position is firm. The demand for solvent naphtha is very fair; but no change is to be recorded in naphthalenes. Carbolic acid remains flat and neglected. Makers of crude are asking 3s. per gallon; but it is doubtful whether this price can be obtained. There is no demand for crystals, and the market is loaded-up with material returned from abroad. Benzoles are scarce; but the Association price has not been advanced, although higher figures are reported paid in some quarters. Anthracene continues in request. The position in intermediates has undergone no material change.

Latest values are as follows:

Benzole: 90% London 4s. 1d., North 3s. 10d. to 3s. 11d.; 50-90% 3s. 6d. London, 3s. 3d. to 3s. 4d. North; crude 60-65%, 2s. 5d. to 2s. 7d.; pure, 4s. 3d. per gallon naked.

Crude Tar: London, 105s. to 115s.; Midlands, 107s. 6d. to 117s. 6d.; North, 105s. to 115s. per ton *ex* works. Refined tar, 95s. per barrel (free) on rail.

Pitch: London, 225s. per ton f.o.b.; East Coast, 215s. per ton; West Coast, 215s., with Manchester 210s. per ton, and Glasgow 215s. per ton; South Wales, 222s. 6d. per ton.

Solvent Naphtha: London, 3s. 6d.; Provinces average 3s. 4d. per gallon.

Crude Naphtha: Naked, 1s. 1d. to 1s. 2d.; North, 1s. per gallon.

Heavy Naphtha: 3s. 8d. per gallon.

Naphthalene: Refined flake, £60 per ton nominal; inferior, £35; crude, £17 to £28 per ton, according to quality.

Toluol: Naked, 3s. 4d. per gallon nominal; North, 3s. 2d.; pure, 4s.

Creosote: London, 1s. 3d. to 1s. 4½d.; North, 1s. 3½d.; heavy oil, 11½d. per gallon in bulk.

Anthracene: 40-45%, 1s. 4d. to 1s. 6d. per unit per cwt.

Grease Oils: 18° Tw. (naked), £6 10s. per ton f.o.r. makers' works.

Pyridine: 20s. to 25s. per gallon.

Aniline Oil: 1s. 10d. per lb., drums extra.

Aniline Salts: 1s. 11d. to 2s. per lb.

Cresylic Acid: Crude, 4s. 3d.; 95%, 4s. 9d. to 5s. 3d.; 97-99%, 5s. to 5s. 6d. per gallon *ex* works London, f.o.b. other ports.

Carbolic Acid: Crude 60%, 3s. per gallon; crystals 40%, 9d. per lb. nominal.

Salicylic Acid: Technical, 2s. 6d.; B.P., 3s. 2d. per lb.

Xylol: Pure, 5s. 9d.; commercial, 5s. per gallon.

Resorcin: 16s. to 17s. per lb.

Alizarine 20%: 2s. per lb.

B. Naphthol: 4s. 2d. per lb.

Sulphate of Ammonia.

Trade remains quiet; but the undercurrent is again good. The effect of the coal strike upon the production of sulphate of ammonia would have been pretty serious if the strike had lasted for any appreciable period; but, happily, there is no further need for any particular pessimism. The export trade continues fair as to quantity, but not so good as to price. The Sulphate of Ammonia Association has done much for the trade during its lengthy existence; and its activities are to be continued by the newly-formed British Sulphate of Ammonia Federation, which should weld the interests of manufacturers for the common good. The final report of the Association again stresses the advent of competing fertilizers, notably synthetic ammonia, which is to be manufactured on a large scale and area, now being rapidly developed in Germany. From the agricultural aspect, urea offers many advantages. The process of manufacture is relatively difficult, however, and so far yields have been low. But the Badische Company evidently believe in the future of this product. The recovery of ammonia from the gases of the blast-furnaces has become an important industry. It has long been known that these gases contain ammonia, and many works have erected costly apparatus for extracting it. A ton of sulphate of ammonia is, I learn, now made per day from the waste gases of two furnaces. A firm of iron-makers also devised a process by which the gases were mingled with sulphurous acid gas, which combines with the ammonia to form sulphite and sulphate of ammonia.

From across the Atlantic, it is reported that foreign competition continues to have a depressing effect on the American market, with sales for export purposes, &c., limited. On the other hand, there is no large accumulation of stocks in any single direction. The entire situation at the moment is one that would cause some anxiety to domestic producers there, when there is taken into consideration the extensive export business that has been done in this particular commodity. Americans say that British producers are making strenuous efforts in the way of obtaining business in Europe. But if present quotations can be any guide to the situation, they add, it is safe to state that the foreign operators are still on a non-competitive basis in so far as prices are concerned.

WRIGHT'S "B.T.U." CIRCULATOR
Showing the pilot light.

"B.T.U." Points worth Consideration

The "B.T.U." Hot-Water Circulator is a thoroughly reliable and successful proposition. The demand for it was never so great as it is now.

It is a cast-iron boiler with strong and long-wearing qualities.

No attention is required except for lighting the gas and turning it out again.

The patent thermostat automatically prevents unnecessary consumption of gas.

The internal metal parts are treated with "Antiscale" for hard-water districts and lime deposits are removable without detriment to the boiler. For soft-water districts the boiler can be bower-barffed as a protection against rust. In either case the life of the boiler is prolonged and its high efficiency continues unimpaired.

JOHN WRIGHT & CO.,
ESSEX WORKS, ASTON,
BIRMINGHAM.

Oriental Gas Company, Ltd.

At the annual meeting next Wednesday, the Directors will report that the revenue account for the financial year ended June 30 shows a satisfactory result of the working. The gas-rental is higher by £10,360 than that of the preceding year; while, on the other hand, the item of expenditure on coals, purification, and wages shows an increase of only half this amount, despite the greatly enhanced prices of coal, labour, and all commodities. The amount yielded by the sale of residual products is higher than that for the corresponding return for the year 1919 by £3517. During the financial year, the exchange value of the rupee (though fallen since the close of the year) has ruled very high, and has yielded a profit of £26,428. In result, the balance of revenue account carried to the credit of profit and loss, after allocating the sum of £10,000 to the renewals' suspense account, is £29,090. The expenditure on capital account has been reduced by £20,886. This was effected by the sale of some surplus land on the Howrah side of the river, which was not required for the purposes of the Company's business and was lying unproductive, supplemented by credits in respect of sundry worn-out plant which is in course of replacement. The Directors have been, and continue to be, impeded in carrying-out their designed operations by the disturbed condition of industry and trade, both at home and in the East. They assure the proprietors of their unremitting efforts and labour to surmount the difficulties that confront them. They recommend the payment of a dividend at the rate of 4½ p.ct., less income-tax, making, with the interim dividend of 3½ p.ct., less tax, a total dividend of 8 p.ct., less tax, for the year.

United States Strike Records Broken.—The United States Department of Labour announce that all strike records were broken during the first five months of the present year. More than 1200 strikes were noted by the Department, affecting millions of workers. There were 3374 strikes and lock-outs in the United States last year. They affected upward of 4,000,000 workers; and about one-half the total number occurred in the great industrial States of New York, Massachusetts, Pennsylvania, Ohio, and Illinois.

The London County Council and the Sliding-Scale.—The Parliamentary Committee of the London County Council report at length upon their proceedings in connection with the Bills promoted by the South Metropolitan and the South Suburban Gas Companies; but with what is said "JOURNAL" readers are already familiar. With regard to the South Metropolitan Bill, the Committee say that, in deciding to withdraw the Council's opposition—a decision in which the Public Control Committee concurred—they were influenced by the special features of this particular Bill; and the Public Control Committee asked that it might be placed on record that the decision was not to prejudice any action which it may be considered desirable to take in the event of any other company applying to Parliament in future for power to alter the existing sliding-scale.

Price of Gas at Lerwick.—At Lerwick, coal freights to which town have been raised, the Gas Company have increased the charge for gas for lighting from 11s. 3d. to 14s. 2d. per 1000 c.ft., and for power and cooking from 10s. 2½d. to 13s. 1½d.

Reduced Price at West Hartlepool.—At a meeting of the West Hartlepool Town Council last week, it was intimated that the Gas and Water Company had already made a reduction of 1s. 4d. per 1000 c.ft. in the price of gas, and that a further reduction of 2d. would be made for gas supplied for domestic purposes.

Sheffield Company Congratulated.—Intimating the intention of the Sheffield Gas Company to reduce the price of gas from 4s. to 3s. 6d. per 1000 c.ft., the "Sheffield Telegraph" says, considering that the cost of coal and of labour have both materially increased, and that quite recently, they can congratulate the Gas Company on having accomplished a rather notable feat.

Price of Gas at York.—The York City Council have had a letter from the Board of Trade to the effect that the Board had been advised that, with the price of gas at 4s. per 1000 c.ft., the York Gas Company would not earn more than sufficient to enable them to pay a dividend of 3 p.ct. per annum upon their consolidated ordinary stock; and that the Board had made an Order fixing the price which the Company may charge to consumers at 4s. per 1000 c.ft.

Light, Heat, and Power Commissioners Suggested.—Referring to Sir Robert Hadfield's recent letter to "The Times" on the subject of our coal resources [*ante*, p. 291], Mr. Charles Bright, writing to the same paper, says: Surely when appointing Electricity Commissioners, the Government should also, on the same grounds, have appointed Gas Commissioners. An even better alternative might have been to appoint Light, Heat, and Power Commissioners. In a subsequent issue, Sir Arthur Duckham wrote: In my report on the Coal Commission, I suggested that the work of the Electricity Commissioners should be extended, and that they should become Heat, Light, and Power Commissioners. Fuel is the bed-rock of our industry. Coal is the basis of all manufacture; and we in England most shamefully waste this most valuable national asset. Heat, Light, and Power Commissioners would not only investigate the possibilities of a cheap electrical supply, but would ascertain the wastage in fuel that is to-day occurring, show manufacturers how such waste can be prevented, investigate the possibilities of making greater use of the gases from blast-furnaces and coke-ovens, and, further, co-ordinate the processes at gas-works with electrical supply. I am not a believer in the Government undertaking the industrial development; but the Government is the proper body to safeguard the interests of the country, and to bring the various industrial interests together in order to attain the greatest efficiency for the country. The Electricity Commissioners may do more harm than good, as they can only deal with the subject on a narrow basis. Heat, Light, and Power Commissioners would consider this basis question on the broadest lines, without prejudice, and with but one object.

Adopt "Carron" Goods for Housing Schemes.

By Appointment

CARRON

Illustration shows a successful item in completed Housing Schemes.

No. 654 "Esto" Gas Cooker, double cased, packed and enamelled. Substantial construction. Maximum oven space. Fitted with one combination grilling and two boiling burners. The oven is packed with non-conducting material. Outer casing is constructed in cast-iron, and inner of porcelain-enamelled steel sheets. Enamelled linings are fixed without screw heads on face of enamel, preventing chipping in expansion and contraction. Burners, burner supports, and grilling plates are removable for easy cleaning and replacement. Hot plate, 22 by 9 in. Height overall, 33 in.

No. 6 P Booklet, illustrating Gas Appliances for Housing, free on application.

CARRON COMPANY Works: CARRON, STIRLINGSHIRE.

Branch Works: Phœnix Foundry, SHEFFIELD.

Showrooms:—LONDON—(City) 15 Upper Thames St., E.C.4; (West End) 50 Berners St., W.1. LIVERPOOL—Redcross St. GLASGOW—Buchanan Street. EDINBURGH—George Street. BRISTOL—Victoria St. BIRMINGHAM—Corporation St.

Offices:—MANCHESTER—14 Ridgefield. NEWCASTLE-ON-TYNE—15 Prudhoe Street.

No. 654. "Esto" Gas Cooker.

Municipal Electricity.—A labour candidate at Reading who advocated the development of the tramway's plant to generate power for the lighting of the town and for supplying each house with current for lighting, cooking, heating, and other domestic purposes, was taken to task by "A. Stoker," who said in a letter to the Press: I do not wish to belittle the many advantages of electricity for various purposes; but from the point of view of fuel economy electricity is far behind gas in the matter of heating. In the process of the conversion of coal into gas 70 p.ct. of the heat is saved for the community and is delivered in the shape of gas or coke; whereas when turned into electricity, at the best only 12 p.ct. of the heat reaches the consumer—the Coal Controller's report gave 8·5 p.ct. for electric generation for the whole kingdom—and at the same time the bye-products are destroyed. These figures are facts, not fiction. The Fuel Research Board report: "The sheet anchor of the gas industry in the future must necessarily be its possession of the cheapest known means of distributing potential heat energy in a convenient form."

Gas Regulation Act and Testing.—The Parliamentary Committee reported to the London County Council on July 27 as to the provisions of the Gas Regulation Bill, and the action taken upon it in the House of Commons. Clause 5 (4) of the Bill required a gas examiner to give to a gas company reasonable notice of the time at which he would attend the testing-place. The Public Control Committee were of opinion that this requirement was undesirable; and an amendment was accordingly drafted, making it incumbent on the company, if they wished to have notice of a test, to make a request to the controlling authority. A representative of the Board of Trade intimated, however, that the point had been raised before, and had been carefully considered; that it was thought that, in practice, there would not be any difficulty in working under the Bill as it stood; and that the Board of Trade would resist any such amendment to the Bill which applied to all undertakings in the United Kingdom. In these circumstances, the Committee now say they did not think that any useful purpose would be served by raising the matter in the House of Lords.

STOCK MARKET REPORT.

THE cessation of the coal strike did not stimulate great accession of activity on the Stock Exchange last week; but, on the contrary, a widespread disposition towards abstention was apparently the word. This increased as the week went on—buyers were decidedly shy, and some markets were quiet to a degree. But after so great a dislocation, it naturally takes some time to recover.

The gilt-edged division, however, was supported by demands for investment. In Home Government issues, strength was well maintained, and the big four closed at a moderate advance—viz., Consols 44⅞-45¼, War Loan 82⅞-82⅞, Funding 67⅝-68⅛, Victory 73¾-74. Bonds were well bought, and Corporation loans were still in good request. Indian were firm. Home Rails advanced—prior charges being especially wanted; but the final prices were not the best of the week. Canadians did fairly well; but Argentines were irregular.

The Foreign Market had some good points in Chilian, Chinese, and Japanese; but French were dragged-down by the exchange, and Belgian, Spanish, and Brazilian were lower.

The Miscellaneous Market on the whole was brighter; a large number of industrial undertakings picking-up a bit. Rubbers and Oils were out of favour and ruled quite dull; and Textiles and Iron and Steel were in much the same case.

Business in the Gas Market—so far as any activity goes—showed a great falling-off; only one company, Imperial Continental, being quite alive. Opening at 131½, it steadily rose every day till it closed on Friday at 144, with a rise of 12 in the quotation. The London Companies, though rather quiet, were very firm, Gas Light ordinary advancing 1, and South Metropolitan 2. All the rest presented a steady front.

Bargains done for cash during the week were as follows: On Tuesday, Bombay 4½, British 22, Croydon "A" 130, Gas Light ordinary 56½, 56⅝, 57½, 58, 59, ditto preference 56½, Imperial Continental 131½, 132, 132⅛, 132¼, 133, South Metropolitan 60½, 61, 62, ditto debenture 47½. On Wednesday, Brentford "A" 54½, 55, Commercial 4 p.ct. 55½, ditto 3½ p.ct. 47½, Gas Light preference 56½, ditto debenture 46½, Hornsey 87½, Imperial Continental 132, 132½, 133, 133½, 134, Primitiva preference 20s. 6d., South Metropolitan 61½, Southampton 57½, Wandsworth "B" 55, 56. On Thursday, Gas Light ordinary 57, 57¼, 57⅜, 58, ditto preference 57½, 57⅝, Hornsey 87, Imperial Continental 134, 134½, 135, 136, 138, 139, South Metropolitan 62¼, 62½, 63, ditto debenture 46½, 48½, Tottenham "B" 52⅝, 53, Massachusetts 116. On Friday, Gaslight ordinary 57, 58, ditto preference 58, Imperial Continental 138½, 140, 140½, 141, 142, 142¼, 142½, 143, 144, ditto debenture 86, 86½, South Metropolitan, 62, 63, 64, ditto debenture 48½.

In the Money Market, with the turn of the month and with the termination of the miners' strike, the position became calm, and business was quiet. Rates ruled easy in view of adequate supplies. Discount business also was on a very moderate scale. Silver was in better demand. The Bank rate is 7 p.ct., fixed on April 17 last.

On Wednesday last, one of the electric motors of the stoking machine at the Skipton District Council Gas-Works broke down, owing to a short-circuit. Stoking had to be done by hand, the Manager (Mr. J. H. Woodward) and staff taking a share in the sudden emergency. The town, of course, suffered some inconvenience from shortage of gas. The officers and employees worked throughout the night; and the damage was repaired early next morning.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue.	Share.	When ex-Dividend.	Ante-War Dividend & Bonus.	Last Dividend.	NAME.	Closing Prices, July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
£			p.c.					
182,049	Stk.	Aug. 27	4	4%	Aldershot 4 p.c. Pref.	...	56—61	...
1,551,868	,,	Oct. 14	2½	3⅛%	Alliance & Dublin Ord.	59—64	36—41	...
374,000	,,	July 14	4	4%	Do. 4 p.c. Deb.	76—79	47—52	...
280,000	5	Oct. 28	7½	8%	Bombay, Ltd.	5½—6½	4½—4¾*	4½
100,000	5	Aug. 12	16	5%	Bourne-mouth Gas and Water: 5 p.c.	...	8—9	...
383,110	10	,,	7	7%	Bourne-mouth Gas and Water: B 7 p.c.	15—15½	8½—9½	...
115,000	10	,,	6	6/-	Bourne-mouth Gas and Water: Pref. 6 p.c.	13½—14	7½—8½	...
162,065	—	June 25	—	4%	Bourne-mouth Gas and Water: 4 p.c. Deb.	...	62—64	...
992,045	Stk.	July 14	14	30/-	Brentford A Consolid.	261—266	50—55	54½—55
734,920	,,	,,	11	26/3	Do. B New	204—209	47—52	...
55,000	,,	,,	5	5%	Do. 5 p.c. Pref.	109—111	68—73	...
221,400	,,	June 10	4	4%	Do. 4 p.c. Deb.	91—93	60—63	...
214,775	,,	Aug. 27	11	7½%	Brighton & Hove Orig.	208—213	120—125	...
244,200	,,	,,	8	5½%	Do. A Ord. Stk.	154—159	78—83	...
1,287,500	Stk.	July 29	5	5%	Bristol 5 p.c. max.	...	...	...
530,000	20	Sept. 15	12½	10%	British	44—45	20—22	22
120,000	Stk.	June 25	4	4%	Do. 4 p.c. Deb. Stk.	88—90	57—59	...
245,771	,,	,,	4	4%	Buenos Aires 4 p.c. Deb.	85—87	39—42	...
100,000	10	May 27	—	—	Cape Town & Dis., Ltd.	1½—2½	7—7½	...
100,000	10	,,	—	4½%	Do. 4½ p.c. Pref.	4—6	5½—6½	...
100,000	Stk.	June 25	4½	4½%	Do. 4½ p.c. Deb. Stk.	70—75	56—61	...
157,150	,,	Feb. 26	5	5%	Chester 5 p.c. Ord.	108—110	...	...
1,523,280	,,	Aug. 12	5/9/4	30/-	Commercial 4 p.c. Stk.	106—108	54—59	55½
560,000	,,	,,	5½	26/3	Do. 3½ p.c. do.	103—105	47—52	47½
475,000	,,	June 10	3	3%	Do. 3 p.c. Deb. Stk.	69½—71½	45—47	...
800,000	,,	Dec. 11	4	—	Continental Union Ltd.	76—79	25—30	...
200,000	,,	,,	7	—	Do. 7 p.c. Pref.	115—118	40—50	...
51,600	,,	Aug. 27	14½	10½%	Croydon A 10 p.c.	...	125—135	130
278,400	—	,,	11½	7½%	Croydon B and C 7 p.c.	..	85—95	...
492,270	Stk.	—	6	5%	Derby Con. Stk.	123—125	...	...
55,000	,,	—	4	4%	Do. Deb. Stk.	102—104	...	...
1,002,180	10	Jan. 29	10	5/0	European, Ltd.	17½—18	6½—7½	...
16,298,975	Stk.	July 29	4/17/4	30/-	Gas Light and Coke: 4 p.c. Ord.	98—102	56—59	56½—59
2,600,000	,,	,,	3½	26/3	Gas Light and Coke: 3½ p.c. max.	76—79	38—41	...
4,062,235	,,	,,	4	4%	Gas Light and Coke: 4 p.c. Con. Pref.	96—99	55—58	56½—58
4,674,850	,,	June 25	3	3%	Gas Light and Coke: 3 p.c. Con. Deb.	72½—74½	45—48	46½
130,000	,,	Dec. 11	10	10%	Gas Light and Coke: 10 p.c. Bonds.	...	...	...
82,500	,,	Sept. 15	5	3½%	Hastings & St. L. 5 pc.	...	53—58	...
258,740	,,	,,	3½	2½%	Do. 3½ p.c.	87—89	37—39	...
70,000	10	May 13	11	8%	Hongkong & China, Ltd.	16½—16¾	8½—9½	...
86,600	Stk.	Sept. 15	9	5½%	Hornsey 7 p.c.	...	87—89	87—87½
131,000	,,	Aug. 12	7½	4½%	Ilford A and C	151—154	79—84	...
65,780	,,	,,	6½	3½%	Do. B	115—118	64—69	...
65,500	,,	June 25	4	4%	Do. 4 p.c. Deb.	92—94	55—58	...
4,940,000	,,	May 14	9	4½%	Imperial Continental	150—160	139—144	131½—144
1,235,000	,,	Aug. 12	3½	3½%	Do. 3½ p.c. Deb. Red.	84—86	82—87	86—86½
235,242	,,	Sept. 15	6½	5%	Lea Bridge Ord. 5 p.c.	119—121	80—85	...
2,498,905	,,	Feb. 26	10	37/6	Liverpool 5 p.c. Ord.: A.	211—213	...	...
					Liverpool 5 p.c. Ord.: B.	146—148		...
306,083	,,	June 26	4	4%	Do. 4 p.c. Pr. Deb. Stk.	...	...	...
165,736	,,	Aug. 12	7/5/6	3½%	Maidstone 5 p.c.	...	52—57	...
75,000	5	June 11	6	3%	Malta & Mediterranean	4¼—4½	1¾—2½	...
250,000	100	Oct. 1	4½	4½%	Met. of Melbourne 4½ p.c. Deb.	99—101	86—93	...
541,920	Stk.	May 27	4	6%	Monte Video, Ltd.	11½—12	70—75	...
1,875,892	,,	July 29	4½	3½%	Newcastle & Gatsh'dCon.	98½—99½	61—63	...
329,705	,,	June 25	3½	3½%	Do. 3½ p.c. Deb.	82—83	50—51	...
15,000	10	Sept. 15	—	8½%	North Middlesex 10 p.c.	...	12½—13½	...
55,940	10	,,	7/14/0	5½%	,, ,, 7 p.c.	14—15	7—7½	...
300,000	Stk.	May 13	8	8%	Oriental, Ltd.	117—122	98—101	...
60,000	5	Mar. 26	10	1/-	Ottoman, Ltd.	7½—7¾	2—3	...
60,000	50	Aug. 27	13	7½%	Portsea Island, B	128—131	65—70	...
100,000	50	,,	12	6½%	Do. C	118—121	50—55	...
249,980	5	April 29	8	—	Primitiva Ord.	5½—6	¼—¾	...
499,960	5	June 26	5	—	Do. 5 p.c. Pref.	4½—5	1—1½	20/6
521,600	100	June 1	4	4%	Do. 4 p.c. Deb.	91—93	69—71	...
600,000	Stk.	July 29	4	4%	Do. ,, ,, 1911	...	40—42	...
346,198	,,	June 25	4	4%	River Plate 4 p.c. Deb.	85—87	38—43	...
150,000	10	Sept. 30	6	6/-	San Paulo 6 p.c. Pref.	10½—11	6½—7½	...
125,000	50	July 2	5	5%	San Paulo 5 p.c. Deb.	47—49	38—40	...
135,000	Stk.	Aug. 27	10	5%	Sheffield A	223—224	67—71	...
209,984	,,	,,	10	4½%	Do. B	222—224	57—61	...
523,500	,,	,,	10	3½%	Do. C	220—222	56—58	...
133,201	Stk.	Sept. 15	4	4½%	Shrewsbury 5 p.c.	...	...	...
90,000	10	Sept. 30	9	9%	South African	10½—11½	10½—11½	...
6,609,895	Stk.	Aug. 12	5/4/0	30/-	South Met. 4 p.c. Ord.	111—113	61—64	60½—64
250,000	,,	July 14	—	5%	Do. Pref.	...	91—93	...
1,895,445	,,	,,	3	3%	Do. 3 p.c. Deb.	72½—74½	45—48	46½—48½
224,820	,,	Aug. 27	8½	3%	South Shields Con. Stk.	157—159	95—96	...
1,087,795	,,	July 29	6	3½%	S'th Suburb'n Ord. 5 p.c.	114—116	57—62	...
247,558	,,	June 25	5	5%	Do. 5 p.c. Deb. Stk.	116—118	65—70	...
647,740	,,	May 13	7½	3½%	Southampton Ord.	99—102	57—60	57½
121,275	,,	June 25	4	4%	Do. 4 p.c. Deb. Stk.	...	59—61	...
120,000	,,	Aug. 12	—	3½%	Tottenham District: A 5 p.c.	135—138	60—65	...
782,275	,,	,,	6	2½%	Tottenham District: B 3½ p.c.	115—117	50—55	52½—53
181,255	,,	June 10	4	4%	Tottenham District: 4 p.c. Deb.	87—89	57—60	...
182,380	10	Dec. 30	3	—	Tuscan, Ltd.	5—6	1—2	...
149,900	10	July 1	3	3%	Do. 5 p.c. Deb. Red.	93—95	45—50	...
236,476	Stk.	Sept. 15	5	3½%	Tynemouth 5 p.c. max.	108½—109	69—71	...
30,000	,,	Aug. 27	8½	47/6	Wandsworth, Wimbledon, and Epsom—Wandsworth A 5 p.c.	151—156	75—80	...
255,636	,,	,,	6½	32/6	Do. B 3½ p.c.	129—134	53—58	55—56
108,075	,,	,,	—	33/3	Do. C	...	50—55	...
140,865	,,	,,	—	33/3	New Ordinary	...	50—55	...
352,000	,,	,,	6½	26/3	Wimbledon 5 p.c.	117—122	43—48	...
98,000	,,	,,	6½	32/6	Epsom 5 p.c.	121—126	50—55	...
88,416	,,	June 25	3	3%	3 p.c. Deb. Stk.	66—69	44—47	...

* Ex Div.

NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer—not necessarily for publication, but as a proof of good faith.

COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office NOT LATER than TWELVE O'CLOCK NOON ON TUESDAY, to ensure insertion in the following day's issue.

Orders to Alter or Stop PERMANENT ADVERTISEMENTS should be received by the FIRST POST on Monday.

UNDISPLAYED ADVERTISEMENTS: Situations Wanted, Six Lines and under (about 36 words) 3s.; each additional Line, 6d. Situations Vacant, Apparatus Wanted and for Sale, Contracts, Public Notices, &c., 9d. per Line—minimum, 4s. 6d.

TERMS OF SUBSCRIPTION to the "JOURNAL."

		ONE YEAR.	HALF-YEAR.	QUARTER.
United Kingdom	Advance Rate:	28/-	15/-	8/8
	Credit Rate:	32/-	16/-	9/6
Abroad (in the Postal Union) Payable in Advance		32/6	17/-	10/-

In payment of subscriptions for "JOURNALS" sent abroad, Post Office Orders or Bankers' Drafts on London only are accepted.

All Communications, Remittances, &c., to be addressed to WALTER KING, 11, BOLT COURT, FLEET STREET, LONDON, E.C. 4.

Telegrams: "GASKING, FLEET LONDON." Telephone: Holborn 6857.

OXIDE OF IRON

FOR SALE OUTRIGHT, OR ON LOAN.

SPENT OXIDE

PURCHASED IN ANY DISTRICT.

GAS PURIFICATION & CHEMICAL CO. LTD.,
PALMERSTON HOUSE,
OLD BROAD STREET, LONDON, E.C.2.

"VOLCANIC" FIRE CEMENT.
Resists 4500° Fahr. Best for Gas-Works.
ANDREW STEPHENSON, Gresham House, Old Broad Street, LONDON, E.C. "Volcanism, London."

MEWBURN, ELLIS, & CO.,
CHARTERED PATENT AGENTS AND
TRADE MARK AGENTS,
70 & 72, Chancery Lane, London, W.C. 2.
Telegrams: "Patent, London." Phone 243 Holborn.
And 8, St. Nicholas Buildings, Newcastle-on-Tyne.

GEORGE WILSON GAS METERS, Ltd.
for
GAS-METERS, ORDINARIES, SLOTS, AND REPAIRS,
Foleshill Road, COVENTRY.
Telephone: 596. Telegrams: "GASMETER,"
and at 7/9, Grosvenor Street, C.onM., MANCHESTER.
Telephone: 3214 CITY. Telegrams: "GASMETER."
and 46 & 47, Auckland Street, LONDON, S.E. 11.

SPENCER'S Patent Inclined HURDLE GRIDS.

THE very best Patent Grids for Holding Oxide Lightly.
See Illustrated Advertisement, p. 355.

SULPHURIC ACID.

SPECIALLY prepared for the manufacture of SULPHATE OF AMMONIA.
SPENSER CHAPMAN & MESSEL, LTD.,
with which is amalgamated WM. PEARCE & SONS, LTD.,
Mark Lane, LONDON, E.C. Works—SILVERTOWN.
Telegrams—"HYDROCHLORIC, FEN, LONDON."
Telephone—1588 AVENUE (3 lines).

ALDER AND MACKAY, LTD.
(ESTABLISHED 1850.)
WET AND DRY METERS,
SLOT AND ORDINARY.
STREET LAMPS AND AUTOMATIC CONTROLLERS.
EDINBURGH.
(See p. 354.)

BRITISH LUX.
AN EXCELLENT PURIFYING MATERIAL.
Features:—
(a) Porosity equal to Best Bog Ore.
(b) Contains Ferric Hydrate in an active state, thus resembling "Lux."
(c) Prepared in good mechanical condition ready for Purifiers.
DANIEL MACFIE, 1, NORTH ST. ANDREW STREET, EDINBURGH.

CORRESPONDENCE TUITION in GAS ENGINEERING for City and Guilds Institute Exams. (Preliminary and Final). Successful Results. Low Fees.
PENNINGTONS ENGINEERING TUTORS, 254, Oxford Road, MANCHESTER.

J. & J. BRADDOCK (Branch of Meters Limited), Globe Meter Works, OLDHAM, and 45 & 47, Westminster Bridge Road, LONDON, S.E. 1.
WET AND DRY GAS-METERS, PREPAYMENT METERS, STATION METERS AND GOVERNORS.
REPAIRS RECEIVE PROMPT ATTENTION.
Telephones: 815 Oldham, and 2412 Hop, London.
Telegrams—
"BRADDOCK, OLDHAM," and "METRIQUE, LAMB, LONDON."

SULPHATE OF AMMONIA
SATURATORS and all LEAD and TIMBER WORK in connection with Sulphate Plants.
We Guarantee promptness with efficiency for Repairs.
JOSEPH TAYLOR AND CO., CHEMICAL PLANT ENGINEERS, BOLTON, LANCS.
Telegrams—"SATURATORS, BOLTON," Telephone 0848.

J. E. C. LORD, Ship Canal Tar Works, Weaste, Manchester. Pitch, Creosote, Benzols, Toluol, Naphtha, Pyridine, all kinds of Cresylic Acid, Carbolic Acid, Sulphate of Ammonia, &c.

BRITISH GAS PURIFYING MATERIAL.
ENGLISH BOG ORE AND NATURAL HYDRATED OXIDE OF IRON.
SPENT OXIDE BOUGHT.

BRITISH GAS PURIFYING
MATERIALS CO., LTD.
(W. T. P. CUNNINGHAM, Proprietor.)
13, ARCADIAN GARDENS, WOOD GREEN, LONDON, N. 22.
Telegrams: "Bripurimat, Wood, London."
'Phone: Palmers Green 608.

TULLY'S PATENT.
CARBURETTED HYDROGEN PLANT
for 300 to 500 B.Th.U.
COMPLETE GASIFICATION OF COAL.
BALE AND HARDY, LTD.,
89, VICTORIA STREET, LONDON, S.W. 1.

CITY AND GUILDS GAS EXAMINATIONS.
MR. CRANFIELD'S well-known and Long-Established Correspondence Classes prepare Students for these Examinations. Individual Attention Given to Students; and the highest results obtained year by year.
Full Particulars on Application to MANOR COURT AVENUE, NUNEATON.

ENQUIRIES SOLICITED.
FOR Gas Works Plant of Every Description; also SULPHATE OF AMMONIA and SULPHUR RECOVERY PLANTS.
C. & W. WALKER, LIMITED,
DONNINGTON, NEWPORT, SALOP.

HUTCHINSON BROTHERS, Ltd.
FALCON WORKS, BARNSLEY.
MANUFACTURERS OF
GAS METERS (Ordinary and Prepayment),
"FALCON" INVERTED LAMPS for Street Lighting
INVERTED BURNERS and CONVERSION SET for Street Lamps.

OXIDE OF IRON.
SPENT OXIDE BOUGHT.
BALE & CHURCH, LTD.
33, ST. MARY AT HILL, LONDON, E.C. 3.
Phone: Avenue 6680.

"TORTO" FIRE CEMENT.
BALE & CHURCH, LTD.
33, ST. MARY AT HILL, LONDON, E.C. 3
Phone: Avenue 6680.

"KLEENOFF," THE COOKER CLEANSER.
Tins for Sale to Consumers.
In Bulk for Works Use.
BALE & CHURCH, LTD.
33, ST. MARY AT HILL, LONDON, E.C.
Phone: Avenue 6680.

JOHN RILEY & SONS, Limited, Chemical Manufacturers, Hapton, near Accrington, are MAKERS of Special SULPHURIC ACID, for Sulphate of Ammonia Making. Highest percentage of Sulphate of Ammonia obtained from the use of this Vitriol, which has now been used for upwards of 60 years. Reference given to Gas Companies.

NATIONAL ASSOCIATION OF TECHNICAL GAS OFFICIALS.

Head Office:—Temple Courts,
55, Temple Row,
BIRMINGHAM.

Full particulars for membership, &c., can be obtained from the General Secretary.

APPOINTMENTS, &c., VACANT.

WHEN Filling Vacancies, please REMEMBER THE CLAIM OF THE EX-SERVICE MAN, who, other Qualifications being equal, has the FIRST CALL ON YOUR CONSIDERATION.

NO. 6984 desire to Thank all those who replied to their Advertisement. The POSITION IS NOW FILLED to their entire Satisfaction.

WORKS' MANAGER wanted for Coal Tar Distillation Plant on North-East Coast.
Apply, stating Age, Experience, Salary required, and Full Particulars to Box "W," MILNER'S ADVERTISING AGENCY, MIDDLESBROUGH.

CHIEF CLERK in Secretary's Office required. Commencing Salary, £250 per Annum.
Applications, stating Age, Qualifications, Experience, and References, to be sent to the GENERAL MANAGER, Gosport Gas and Coke Company, GOSPORT.

PLANT, &c., FOR SALE & WANTED.

REQUIRED — One Second-Hand Cast- Iron Rectangular TANK. Capacity, 20,000 Gallons.
Address No. 6991, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

WANTED — Two Gas Exhausters, 20,000 to 30,000 c.ft. per Hour, Either driven by Belt, Gas-Engine, or Electrically (D.C., 500 volts.)
Write No. 6990, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

London Office: DORMAUGHT MANSIONS, 34, VICTORIA STREET, S.W. 1.
R. & J. DEMPSTER, LTD., MANCHESTER.
"PAN ASH, COKE BREEZE & COAL WASHER.
NOTTINGHAM, LTD.
SOLE MAKERS OF THE